SCHOOL HEADS' AND TEACHERS' INITIATIVES ON EDUCATION 4.0:
BASIS FOR BLUEPRINT FOR A STRATEGIC FORESIGHT

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MARIBETH R. VIADOR

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APPROVAL SHEET

    This dissertation entitled **"SCHOOL HEADS' AND TEACHERS' INITIATIVES ON EDUCATION 4.0: BASIS FOR BLUEPRINT FOR A STRATEGIC FORESIGHT",** prepared and submitted by MARIBETH R. VIADOR in partial fulfillment of the requirements for the degree, Doctor of Philosophy major in Educational Management, has been examined and is recommended for acceptance and approval.

MA. CHARITO ROBLES-CRUZ, PhD
Adviser

Approved by the EXAMINATION COMMITTEE on May 16, 2024.

JOHN EDWARD Y. CRUZ, PhD   **RAMILO C. CRUZ, PhD**
Member   Member

LAURO S. NUÑEZ, EdD
Member

CECILIA S. SANTIAGO, PhD
Chairperson

    Accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, major in Educational Management.

MARIA KRISVIE ABIGALE F. MENDOZA
Dean, Institute of Education

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Ad Gloriam Dei.

M. R. V.

BIOGRAPHICAL SKETCH

The researcher is a dedicated educator and passionate researcher in the field of education. Born on April 28, 1988, in Baliwag, Bulacan, she is the youngest daughter of Mr. and Mrs. Manuel Tecson Reyes and Elvira Nieto Cruz. Currently residing at Cunanan St., Sto. Cristo, Baliwag, Bulacan, she balances her professional responsibilities with her roles as a caring wife to her supportive husband, Ronaldo, and a loving mother to Ron Emmanuel.

After earning her Bachelor's degree in Elementary Education, majoring in General Education, from Bulacan State University, Bustos Campus, in 2010, she began her teaching career as an elementary school teacher at Immaculate Conception School of Baliwag in Concepcion, Baliwag, Bulacan. In 2013, she joined the Department of Education at Matias A. Fernando Memorial School in Angat District, San Roque, Angat, Bulacan, where she was recommended to pioneer the Special Science Class for Grade Two due to her enhanced digital literacy and innovative classroom practices as a 21st-century teacher. These experiences fueled her curiosity about how learners acquire knowledge and motivated her to pursue higher education.

In 2017, she earned her Master of Arts in Education, majoring in Educational Management. Her research focused on the effectiveness of macro skills and linguistic confidence on pupils' communication skills, which laid the foundation for her subsequent research endeavors. In 2018, she transferred to her alma mater, Baliwag South Central School, where she has been serving as a Teacher III.

With over a decade of experience in education, she also serves as the School Information and Communications Technology (ICT) Coordinator and School-Based Quarterly Program Implementation Review (SPIR) District Coordinator. She has spearheaded the integration of technology into the school's curriculum by introducing interactive e-learning platforms, digital resources, and advanced classroom technology.

In addition to her teaching responsibilities, she has been invited as a resource person to workshops and professional development sessions for educators, sharing insights on creating engaging and innovative teaching methods, commitment to evidence-based

pedagogy, and effective learning environments. Her dedication to bridging the gap between digital natives and immigrants has earned her the respect of both colleagues and peers.

As a true advocate for equitable access to technology, she firmly believes in the practical application of ICT in the classroom and its transformative potential. She remains dedicated to advancing the role of technology in education, making a lasting impact on students, teachers, and schools.

VIADOR, MARIBETH R.: SCHOOL HEADS' AND TEACHERS' INITIATIVES ON EDUCATION 4.0: BASIS FOR BLUEPRINT FOR A STRATEGIC FORESIGHT
Adviser: DR. MA. CHARITO ROBLES-CRUZ

ABSTRACT

This study determined the significance and relationship of the school heads' and teachers' initiatives on Education 4.0 and the school and classroom climate in all schools comprising EDDIS II during the School Year 2023-2024. With explanatory sequential mixed methods as research design and 52 school heads and 384 teachers as respondents of the study, findings showed that there was no significant difference between the assessment of school heads and teachers on school and classroom climate. School heads' and teachers' initiatives on Education 4.0 have direct correlation with school and classroom climate.

The study revealed that most school heads and teachers are middle-aged, predominantly female, married, hold master's and doctorate degrees, and have extensive tenure. School heads strongly asserted their role as initiators of Education 4.0 across various domains, while teachers similarly expressed their initiative in Education 4.0 aspects. Significant differences were found in school climate assessments between school heads and teachers, but not in classroom climate. Furthermore, significant relationships were identified between school heads' initiatives and age, and between teachers' initiatives and educational attainment and gender. Additionally, significant relationships were found between school heads' Education 4.0 initiatives and school climate, as well as between teachers' Education 4.0 initiatives and both school and classroom climate.

Based on the findings of the study, the following conclusions were drawn: There is a significant difference between the assessments of the school heads and teachers with regard to school climate. There is a significant difference between the school heads' and teachers' initiatives on Education 4.0 when they are classified according to their profile. There is a significant relationship between school heads' and teachers' initiatives on Education 4.0 and school and classroom climate.

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CHAPTER I

THE PROBLEM AND ITS BACKGROUND

Introduction

The rapid development of technology has played a significant role in the fascinating evolutionary path that education has been on recently. The classic chalk-and-blackboard method is no longer the only way to disseminate knowledge in this new century; education is no longer limited to the four walls of a classroom. Instead, technology has created a world of opportunities that let people discover and access knowledge in ways they never could have anticipated. These changes have brought about Education 4.0 that has really shaped education in ways that are totally revolutionary. Hence, this situation has made the researcher reflective of the concrete ways wherein both school heads and teachers navigate the changes that the era of Education 4.0 has brought into the education sector as a general and in educators' life in particular. As such, this study targets to delve deeper into the possible initiatives that school heads and teachers may engage themselves into that, in turn might be used as basis for crafting blueprint for strategic foresight toward improving school and classroom climate.

Moreover, there are several ways in which technology affects schooling. From what the researcher has been observing, the use of technology in lesson delivery engages students effectively, leveraging multimedia presentations, interactive games, and digital worksheets. This approach fosters collaboration, personalized learning experiences, and real-time feedback, ultimately enhancing student engagement and learning outcome. Furthermore, it has mostly broadened the boundaries of knowledge. Teachers are now more than just information distributors; they are also facilitators, mentors, and guides. Learning management systems and other tools help teachers monitor students' progress and give timely feedback, improving the quality of instruction overall.

School administrators are also significantly impacted by the use of technology in education. The researcher had seen that the successful integration of technology in lesson delivery hinges on active support and leadership from school heads, who provide resources

and promote professional development for teachers. Their guidance fosters a culture of innovation, enhancing teaching and learning experiences and contributing to improved student performance.

With its emphasis on innovation and optimization of the use of information, the internet, and technology, Education 4.0 ushers in a new era in the education industry. Human-machine interactions are becoming widely available due to technology, which has sped up the pace of invention (Lawrence et al., 2019). The idea anticipates how education will develop in the future due to the fast progress of technology, the changing needs of students, and the demands of the labor market.

Thus, schools are reacting to a new educational paradigm in the framework of Education 4.0. In fact, Alda (2020) highlighted that school officials need to stress how urgently the educational system needs to be reformed in light of the shift to Industry 4.0. Schools that use this approach aim to educate their students about the opportunities and challenges of the labor market in addition to academic accomplishment.

In line with these, initiatives in the context of Education 4.0 can be described as proactive and strategic actions taken to implement innovative educational practices that align with the demands of the digital age. These initiatives focus on integrating technology, fostering critical thinking and collaboration skills, and promoting a dynamic learning environment that prepares students for the future workforce. They often involve the development of new pedagogical approaches, the adoption of digital tools and resources, and the enhancement of teacher training to effectively leverage technology in education (González-Pérez et.al., 2022).

In the same manner, the Department of Education (DepEd) has been actively developing a number of programs to link the educational system with the ideas of Education 4.0. Hence, DepEd Order No. 24. s. 2022 for instance, adopts the Basic Education Development Plan (BEDP) 2030 as the medium-term plan that encompasses all formal education. This is based on the goals and objectives of DepEd, the development strategy of the national government, international agreements, and worldwide educational trends that have been adjusted for the Philippine setting. This also enhances its usage of alternative learning approaches. This featured online learning, modular education, and

instruction via radio and television, demonstrating the flexibility required for Education 4.0.

Aligned with these, DepEd continues to build bridges across divides in order to guarantee that all students have equitable access to high-quality education. To ensure that all students have equal access to high-quality education, DepEd keeps on bridging the digital divide and serving the needs of underprivileged communities as one of its top priorities. DepEd has collaborated with several public and private organizations, providing access to technology, resources, and experiences, in order to support initiatives related to Education 4.0.

Consequently, Department of Education - Schools Division of Bulacan, issued Division Memorandum No. 262, s. 2023, through the Curriculum Implementation Division and Learning Resource Management System, that initiated the conduct of a workshop on digital enhancement for new normal instruction which is the first step in converting the existing quality-assured localized learning materials into digitized versions using different digitization tools, and ensure availability of digitized learning resources for K-12 learning.

As clarified by Ramí-rez-Montoya et al. (2021), incorporating innovative approaches, teacher training, and cutting-edge online education are required elements when designing or redesigning innovative programs for the area of education.

School teachers nowadays are encouraged to use technological- based tools in teaching. Furthermore, educators today are pushed to reconsider modifications of the curriculum to prepare students for the future. According to Tupas and Noderama (2020), DepEd officials are encouraged to start incorporating Education 4.0 in In-Service Training (INSET). Presently, many schools are actively planning or engaging in school reforms in response to the growing demands for quality education and accountability. However, most of these school reforms might not take off if there is no buy-in or acceptance from the teachers (Tai et al., 2022). In the most general sense, school leadership can be stated to be related to strategic leadership in the context of Education 4.0.

Prestiadi et al., (2020) emphasized that School Principals as educational leaders are expected to be able to carry out their duties properly and make changes through their leadership by utilizing all the potential and abilities possessed by existing human resources.

Through transformational leadership, the principal can be a solution to keep abreast of developments in the Industrial Revolution 4.0 era by utilizing information and communication technology in the development of digital-based education. Hence, the human side of Education 4.0 is so important since it is the sector responsible for raising awareness and being the workforce of Industry 4.0 (Himmetoglu et al., 2020). This is because a good knowledge management process will encourage creativity and lifelong learning among students helping them to succeed in a knowledge-based economy.

In addition, the increasing demands for school reforms in the era of Education 4.0 continuously challenge the roles of school leaders. As schools continually embark on programs pertaining to school effectiveness, it is a sine quo non for school leaders to equip themselves with subsequent critical competencies so as to perform effectively in leading sustainable schools in the Era of Education 4.0 (Ghouri, 2020). Hence, to a large extent, the success of school improvement agenda in the era of Education 4.0 hinges on such pervasive awareness and deliberate practices that may create possibilities for sustained meaningful teacher learning and development that breeds excellence (Tai et al., 2022).

As per McGregor's description (2023), the school climate plays a crucial role in determining various aspects of the school, including the quality of relationships among individuals, teaching and learning activities, administrative staff collaboration, and support systems. Consequently, the school climate affects all members of the school community.

Conversely, classroom climate includes the aspects of the learning environment that are associated with the academic, social, personal, and cultural characteristics of students in a particular setting as well as how they understand what goes on there as a result of their interactions with the teacher, other students, and the material that needs to be learned.

As such, in order to encourage good learning and to pique students' interest in studying, the classroom environment is crucial (Hugerat, 2021). Thus, the synergy between leadership initiatives at the school level and the innovative practices of teachers within classrooms may create a harmonious educational ecosystem. This holistic approach not only propels the school community towards the forefront of educational advancements but also may cultivate an environment where students are equipped with the skills and mindset

necessary for Education 4.0.

Henceforth, the strategic vision emphasizes school heads' and teachers' initiatives for professional growth, group planning, and continuous support, ensuring cutting-edge teaching techniques and technology integration align with the school's mission, creating a cohesive learning environment where teachers and students can flourish under Education 4.0.

The aforementioned rationale led the researcher to undertake this study with the intention of highlighting the initiatives on Education 4.0 that school heads and teachers have taken that can be used as basis for crafting blueprint for strategic foresight toward improved classroom and school climate.

Literature Review

The transformation of the educational system from one that is focused on procedures and facts to one that actively develops and applies knowledge to deal with complicated problem solving in the actual world is one of Education 4.0's key characteristics. (Tai et al., 2022). The Fourth Industrial Revolution has accelerated many changes, and different and specialized skill sets of human capital have been requested by the diverse social economy conditions, according to Göker and Göker's study from 2021. Drawing on the findings of the previously described researches, this study examined the effect of Education 4.0 initiatives on the school and classroom climate.

According to Kin (2019), the goal of Education 4.0 is to address the issues presented by Industry 4.0 by shifting the focus of the educational system from facts-based to knowledge-based, collaborative problem-solving. Human-tech literacy resources are needed for that future intelligent information society, which will enable people to prosper in a globalized economy. Similar to this research, Education 4.0 was essential in raising the bar for education.

As such, Alda (2020) pointed that educational institutions must adapt to the shift towards digital tools and platforms in the future, as learning becomes the norm. This dynamic transformation requires a shift in the relationship between institutions and society,

with instructors playing a crucial role in this shift. In a similar vein, this study indicated that school heads and teachers ' initiatives are essential for digital transformation.

The present study concurred with the notion put forth by Turan-Güntepe & Abdüsselam (2022) and Narh-Kert et al. (2022) that successful education of the IR 4.0 generation can be achieved by the incorporation of new technologies into Education 4.0. To ensure that the system complies with standards, initiatives on curriculum content, objectives, learning experiences, and assessment components are essential for system implementation. Tai et al. (2022) have provided support for the concept that sustained meaningful teacher learning and development that fosters excellence is largely dependent on deliberate practices and widespread awareness in the context of Education 4.0.

Unfortunately, as the research by Apas et al. (2021) demonstrates, schools in the Philippines lack the infrastructure and resources necessary to implement Education 4.0. The results also highlight how vital it is for all schools to modernize their IT infrastructure and advance their educational initiatives. This was largely related to the study since the researchers' goal is to provide teachers and school administrators with extensive knowledge about Education 4.0. and how it affects the classroom and school environment. This knowledge can be useful for strategically planning for the aforementioned transition.

As backed by Kin's (2019) study, which emphasizes school leaders as the primary change agents in reforms, Prestiadi et al.'s (2020) study highlights the importance of educational leaders in advancing educational institutions and strikes a balance between meeting external expectations and the need to reengineer schools for Education 4.0. Improving leadership ability is essential for the educational system's change to be effective. According to this latest study, school administrators were critically important in implementing Education 4.0 because they could the lead in this regard. School heads are key in aligning their mission with Education 4.0 principles through strategic planning, policy development, and technology integration. Their forward-thinking approach enhances infrastructure, encourages change, and fosters an innovative climate.

On the other hand, Sharma et al. (2022) and Goker and Goker (2021) emphasize the evolving role of educators in the transition to Education 4.0. They suggest fostering professional development, behavioral change, and self-directed learning through a

professional and reflective learning community. It is obvious that if teachers establish a this with the goal of fostering professional development and behavioral change in reflective practices, learning will become self-directed and they will undoubtedly become empowered through learning management, which appears to be a crucial task required by Education 4.0.

Acceptance, according to Bonfield et al. (2020), is essential for school reforms to be successful since teachers' attitudes about change affect their capacity for adaptation. Teachers need to keep an eye on how Education 4.0 influences conventional pedagogies and teaching techniques. As per the current study, teachers always take the initiative to support an exceptional school system because they serve as classroom facilitators.

In his research, Osher (2021) made the point that, while important, climate has a relatively small role in creating strong, productive learning settings. A positive atmosphere leads to improvement and also helps to bring about improvement. It can be measured effectively and affordably. Additionally, it can generate clear, useful data that can be objectively gathered and applied to enhance performance at the state, district, and school levels. However, Aksakalli (2017) highlighted that the terms learning environment, classroom atmosphere, and classroom climate have all been used interchangeably. The connections between students and teachers, the regulations that must be observed, and the psychological, social, and physical consequences of the physical aspects of the classroom can all be considered aspects of the classroom climate.

As this research believed, these literatures highlight the significant influence that initiatives carried out by school administrators and teachers have on the school and classroom climates in the era of Education 4.0. Together, these initiatives not only enhance academic achievement but also cultivate essential 21st-century skills, preparing learners to thrive by embracing a holistic approach to educational reform that prioritizes innovation, collaboration, and learner-centered learning and transcends the boundaries of Education 4.0 to continued advancement in educational practices for the benefit of school and communities alike.

Theory and Conceptual Framework

Education 4.0 revolutionizes education by integrating advanced technologies, personalized learning, and 21st-century skills. These technologies create interactive and personalized learning experiences, aligning with the student-centered approach of active learning. Active learning theory emphasizes student engagement and participation in the learning process through activities like discussions, analysis, and problem-solving. In the context of Education 4.0, active learning is enhanced by leveraging advanced technologies such as artificial intelligence, virtual reality, and cloud computing. These technological advancements promote collaborative, innovative, and adaptive learning environments, enhancing the effectiveness of active learning strategies in preparing students for the demands of the future workforce (Patiño et al. 2023).

In addition, Oliveira and De Souza (2021) emphasized in their study a theoretical framework called TADEO (acronym in the Portuguese language to Transformação Digital na Educação) Method that guides them to conclude that the development of teaching and learning experiences in Education 4.0 focuses on practice of skills essential for the digital era.

School heads, as educational leaders, are pivotal in spearheading institutional change and nurturing innovation, drawing from leadership theories like transformational and distributed leadership. They are responsible for envisioning Education 4.0-compatible learning environments, mobilizing resources, and empowering teachers to implement change. Additionally, teachers' leadership roles in instructional design, curriculum development, and technology integration are vital for maximizing the benefits of Education 4.0 in classrooms, as emphasized by Çetin and Karsantık (2022).

Meanwhile, the study by Maxwell et al. (2017) linked school and classroom climate to social cognitive theory and social identity approach. Social cognitive theory suggests collective efficacy and staff perspectives impact academic outcomes. The social identity approach, which includes social identity theory and self-categorization theory, suggested psychological connection to the school positively impacts academic performance. School and classroom climate, including safety, inclusivity, supportiveness, and engagement, significantly influenced student learning outcomes.

Independent Variables	Dependent Variables
School Heads' and Teachers' Initiatives on Education 4.0	School and Classroom Climate
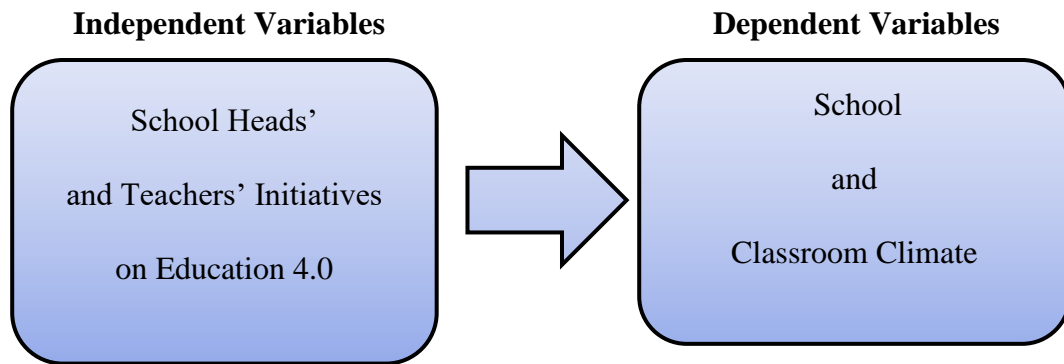
Figure 1. *Paradigm of the Study*

Figure 1 shows that the heart of this study lay on the concept of initiatives of school heads and teachers on Education 4.0 as the independent variable. As dependent variables, the school and classroom climates serve as a crucial indicator of the effectiveness of Education 4.0 initiatives. This collaboration between school heads and teachers was necessary in establishing a positive school and classroom climate. Consequently, this research explored the proactive initiatives of teachers and school heads had taken inside the context of Education 4.0 in an effort to clarify their input and identify trends that may help develop a strategic foresight plan within the framework of the study.

Statement of the Problem

The primary objective of this research was to analyze the initiatives implemented by school heads and teachers in response to Education 4.0 and assess their direct impact on the overall school and classroom climate.

Specifically, it sought to answer the following questions:

1. How may the demographic characteristics of the school heads and teacher-respondents be described as to:

    1.1. age;

    1.2. sex;

    1.3. civil status;

    1.4. highest education attainment;

    1.5. designation/position; and

    1.6. years in service?

2. How may the school heads' initiatives on Education 4.0 be described as to:

    2.1. leading strategically;

    2.2. digital infrastructure requirements;

    2.3. personal and professional development;

    2.4. building connections; and

    2.5. ICT skills acquisition /enhancement?

3. How may the teachers' initiatives on Education 4.0 be described in terms of:

    3.1. content knowledge and pedagogy;

    3.2. teaching and learning practices/readiness;

    3.3. personal growth and professional development

    3.4. community linkages and professional engagement; and

    3.5. assessment and reporting?

4. How may school and classroom climate be described as to:

5. Is there a significant difference between the assessments of the school heads and teachers with regard to school and classroom climate?

6. Is there a significant difference between the school heads' and teachers' initiatives on Education 4.0 when they are classified according to their profile?

7. Is there a significant relationship between school heads' and teachers' initiatives on Education 4.0 and school and classroom climate?

8. How may the results or findings derived from this study on Education 4.0 be relevant and contribute to the field of effective facilitation of learning and the development of educational management?

9. What strategic blueprint could be crafted from the results of the study?

Hypotheses

    The following hypotheses will be tested at 0.05 level of significance level:

    1. There is no significant difference between the assessments of the school heads and teachers with regard to school and classroom climate.

    2. There is no significant difference between the school heads' and teachers' initiatives on Education 4.0 when they are classified according to their profile.

3. There is no significant relationship between school heads' and teachers' initiatives on Education 4.0 and school and classroom climate.

Significance of the Study

This study might have been beneficial in the educational arena, potentially helping educators understand how initiatives by school heads and teachers for the era of Education 4.0 related to or affected the school and classroom climate. The potential benefits extended to the following groups:

Principals. The results of the study might have enlightened principals about the initiatives related to Education 4.0, providing them with knowledge to create a harmonious and effective learning environment.

Teachers. Understanding the initiatives taken by teachers could have led to the identification of best practices that enhanced learning outcomes. This may have highlighted the need for specific professional development opportunities to help teachers thrive in the Education 4.0 environment.

Pupils. The study's findings might have positively impacted students' educational experiences and their preparation for the demands of the 21st century, keeping them relevant and competitive on a global scale. This may have resulted in improved learning experiences through the integration of innovative teaching methods, technology, and resources.

Parents. The findings of the study could have informed parents about their children's education by helping them understand proactive initiatives by school heads and teachers, enabling them to support and reinforce their child's learning experiences at home.

School Stakeholders. Schools might have improved student experiences by forming partnerships with external stakeholders. The findings could have assisted in partnering on Education 4.0 efforts and exchanging information to achieve educational objectives.

Curriculum policy makers. The findings could have helped in crafting policies and adjustments that were forward-thinking and responsive to the changing needs of the educational system. This might have guided the allocation of resources and training programs for teachers and school heads.

Future Researchers. The researcher believes that this study added to the body of knowledge in the field of education, particularly in the context of Education 4.0. Researchers and academics could have used the findings as a basis for further investigations and comparative studies in different educational settings.

Overall, this study provided a comprehensive understanding of Education 4.0's efforts in the school community, highlighting its potential for community growth and development.

Scope and Limitation of the Study

In the conduct of the study, variables were limited to school heads' and teachers' initiatives on Education 4.0, school and classroom climate.

The school heads' initiatives on Education 4.0 were limited to leading strategically, digital infrastructure requirements, personal and professional development, building connections and ICT skills acquisition /enhancement. Meanwhile, teachers' initiatives on Education 4.0 were limited to content knowledge and pedagogy, teaching and learning practices/readiness, personal growth and professional development, community linkages and professional engagement and assessment and reporting. On the other hand, school and classroom climate focused only on learning environment and diversity of learners, classroom management, curriculum delivery and assessment and reporting.

The respondents of the study were composed of the school principals and teachers of Education District II comprised by Baliwag North, Baliwag South, Bustos and Plaridel Districts.

Definition of Terms

For the purpose of clarity, accuracy and better understanding of this dissertation, the following terms were operationally defined as they used in this study:

Blueprint for Strategic Foresight. This refers to the strategic framework to guide teachers and school heads in navigating the opportunities and challenges of Education 4.0.

Building Connections and ICT Skills Acquisition/Enhancement. This refers to the initiative that strengthen connections and partnerships among teachers, learners, and

the community to integrate ICT skills acquisition and enhancement.

Classroom Climate. This refers to the encompassing teacher-learner relationships, management strategies, and learning experiences, significantly impacts student motivation, engagement, behavior, and academic performance in Education 4.0 integration.

Classroom Management. This refers to the strategies and practices implemented to create a conducive learning environment, promote positive behavior, and facilitate effective instruction, fostering student autonomy and responsibility.

Curriculum Delivery and Assessment. This refers to the processes, methods, and instructional approaches in Education 4.0 environments using formative and summative assessment strategies and implementing feedback mechanisms for meaningful learning outcomes.

Digital Infrastructure Requirements. This refers to the technological components crucial for supporting Education 4.0 initiatives in school to ensure personalized and technology-enhanced learning experiences.

Education 4.0. This refers to the integration of emerging technologies like AI, machine learning, robotics, and digital platforms to improve learning experiences, promote personalized education, and equip students for the Fourth Industrial Revolution.

Personal and Professional Development. This refers to the continuous learning and development of skills of teachers and school heads on integrating Education 4.0 into their practices.

Reporting. This refers to the act of sharing of learners' progress, achievement, and outcomes through feedback to foster collaborative partnerships between teachers and parents.

School Heads' Initiatives. This refers to proactive actions, policies, and leadership strategies, innovation, and resources provided by the school heads implementing Education 4.0.

School Climate. This refers to the socio-cultural and organizational environment within a school, influencing academic achievement, learners' engagement, teacher engagement, and overall well-being.

Teachers' Initiatives. This refers to the teachers' teaching practices integrating

Education 4.0 like adopting innovative methods, creating digital resources, and cultivating 21st-century skills.

Teaching and Learning Practices/Readiness. This refers to teachers' ability to integrate Education 4.0 into teaching and learning readiness and promote critical thinking, creativity, and collaboration.

CHAPTER II

RESEARCH METHODS

The information about the research and sampling procedures that are utilized by the researcher are provided in this chapter. The research design that is employed, as well as the data gathering techniques, and data analysis scheme are also discussed in this chapter.

Research Design

In order to answer the problems presented in the preceding chapter, the study employed explanatory sequential design which involved an initial quantitative phase followed by a qualitative phase to provide a comprehensive understanding on school heads' and teachers' initiatives on Education 4.0 on the influence of school and classroom climate.

The quantitative phase of the explanatory sequential design involved collecting data of Education 4.0 initiatives on school and classroom climate. The data were analyzed using statistical methods like correlation analysis. This phase served as the foundation for the qualitative phase, which explored the underlying reasons and experiences shaping these relationships.

On the other hand, for the qualitative phase, the researcher used interview to gather rich, detailed information about the perceptions, experiences, and attitudes of school heads and teachers regarding Education 4.0 initiatives and their effect on school and classroom climate. This phase helped in understanding the underlying reasons, motivations, challenges, and potential benefits associated with the initiatives. It also allowed a deeper exploration of how these initiatives influence the overall climate in schools and classrooms, including factors like collaboration, innovation, engagement, and learning outcomes.

According to Dawadi et al. (2021), by employing an explanatory sequential design, a study could benefit from the strengths of both quantitative and qualitative approaches. The sequential nature of the design allowed a systematic and structured exploration, starting with quantitative data collection to establish relationships and patterns, followed by qualitative inquiry to provide depth and context to the findings. This

design ensured a comprehensive and nuanced understanding of how Education 4.0 initiatives influence school and classroom climate, offering valuable insights for educational practice and policy.

Sampling and Respondents

Purposeful sampling was employed to select the respondents. Benoot et al. (2016) defined purposeful sampling techniques, such as extreme intensity, maximum variation, and homogenous sampling, as essential for qualitative evidence synthesis. These techniques helped researchers select information-rich cases, overcome constraints, and enhance the quality and depth of their research. Palinkas et al. (2013) clarified that purposeful sampling played a crucial role in mixed methods implementation research by selecting cases that were rich in information related to the research focus. It is essential to align the chosen purposeful sampling strategy with the specific aims and quantitative method designs of the study to achieve meaningful results.

The researcher conducted the study in Educational District II of Bulacan. The respondents, on the other hand, consisted of the school heads and teachers assigned to the public elementary schools. All principals served as respondents, while thirty percent of the teachers per school were considered teacher respondents.

As shown in Table 1, a total of 52 school heads and 384 teachers in the different schools with the sum 436 were the respondents.

Table 1

The Distribution of Respondents of the Study

District	Name of School	School Head	Teachers
Baliwag North	1. Baliwag North Central School	1	16
	2. Catulinan Elementary School	1	4
	3. Dr. Guillermo Dela Merced Memorial School	1	9
	4. Dr. Nicolas V. Rustia Memorial School	1	5
	5. Engr. Vicente R. Cruz Memorial School	1	11

Baliwag South	6. Hinukay Elementary School	1	4
	7. Jacinto Ponce Elementary School	1	11
	8. Paitan Elementary School	1	2
	9. Sabang Elementary School	1	13
	10. Jose V. Ycasiano Memorial School	1	6
	11. Tilapayong Elementary School	1	11
	12. Subic Elementary School	1	4
	13. Baliwag South Central School	1	10
	14. Calantipay Elementary School	1	4
	15. Concepcion Elementary School	1	11
	16. Makinabang Elementary School	1	11
	17. Matangtubig Elementary School	1	4
	18. Pinagbarilan Elementary School	1	8
	19. San Jose Elementary School	1	5
	20. Sta. Barbara Elementary School	1	14
	21. Tarcan Elementary School	1	8
	22. Tiaong Elementary School	1	4
	23. Virgen Delas Flores Elementary School	1	4
Bustos District	24. Bonga Mayor Elementary School	1	6
	25. Bonga Menor Elementary School	1	5
	26. Bulacan Heights Elementary School	1	9
	27. Bustos Elementary School	1	15
	28. Camachilihan Elementary School	1	4
	29. Cambaog Elementary School	1	6
	30. Catacte Elementary School	1	4
	31. Dr. Ramirez Memorial Elementary School	1	4
	32. Liciada Elementary School	1	10
	33. Simplicio S. Del Rosario Memorial Elementary School	1	4
	34. Malamig Elementary School	1	4

	35. San Pedro Elementary School	1	6
	36. Tibagan Elementary School	1	9
	37. Lucas N. Domingo Elementary School	1	4
	38. Banga Elementary School	1	16
	39. Bintog Elementary School	1	6
	40. Culianin Elementary School	1	6
	41. Dampol Elementary School	1	5
	42. Don Nemencio Memorial School	1	6
Plaridel District	43. Lagundi Elementary School	1	7
	44. Lalangan Elementary School	1	3
	45. Lumangbayan Elementary School	1	5
	46. Parulan Elementary School	1	8
	47. Plaridel Central School	1	21
	48. Rueda Elementary School	1	2
	49. San Jose Elementary School	1	7
	50. Sipat Elementary School	1	6
	51. Sto. Niño Elementary School	1	9
	52. Tabang Elementary School	1	8
		52	**384**

For the qualitative part, 3 school heads and 3 teachers in each district, with a total of 12 principals and 12 teachers, were requested to participate in the conduct of the semi-structured interview. These respondents were given prior information about the topics that were discussed in the interview for them to be ready.

Locale of the Study

The study was conducted in the public elementary schools of EDDIS II, comprising Baliwag North, Baliwag South, Bustos, and Plaridel Districts. It is where the researcher is employed. This familiarity with the locale's educational culture could add depth to the study. Figure 2 shows the map of EDDIS II, consisting of 52 complete elementary schools.
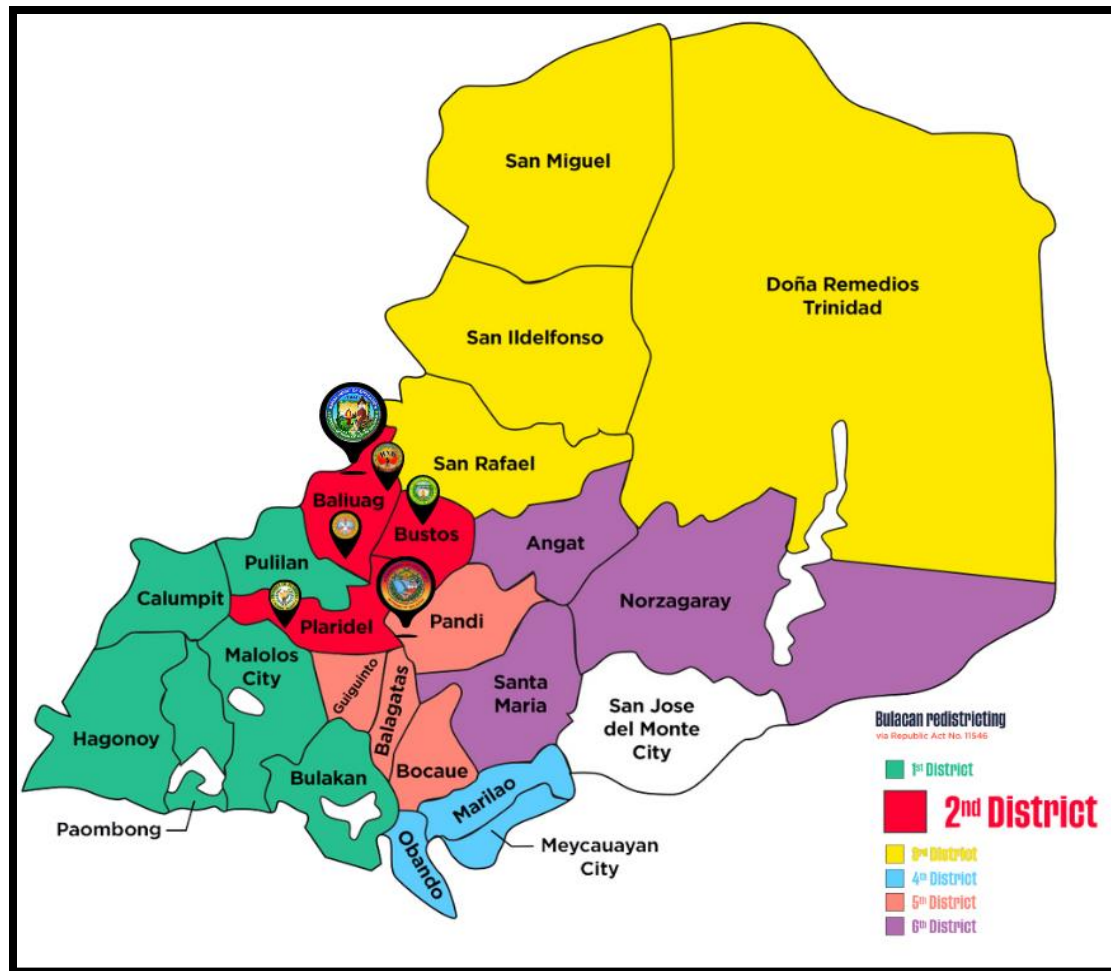
Figure 2. *Map of EDDIS II, Bulacan Map*

Instrument

The study utilized the survey questionnaire which was composed of the five (5) parts. Part I of the questionnaire described the demographic profile of the respondents. Part II was adapted from Alda (2020), DepEd Order No. 24, s. 2020 titled National Adoption and Implementation of the Philippine Professional Standards for School Heads (PPSSH), Eremie and Agi (2018). This part of the questionnaire was used to gauge the school heads' initiatives on Education 4.0. while Part III was adapted to DepEd Order No. 4 s. 2022 which described the teachers' initiatives on Education 4.0. Meanwhile, Part IV was adapted from Barnová et al. (2022) on which was utilized to describe the school climate. Part V was adapted from Bennett (2001) and was used to describe the classroom climate. Some revisions and modifications were made to these questionnaires in order to fit the situation

of education in the country today.

The questionnaire underwent a pilot testing phase at Matias A. Fernando Memorial School in Angat District on March 22, involving a total of 10 school heads and 40 teachers. This sample size was chosen to ensure representation from both leadership and teaching roles within the educational institution. The data underwent Cronbach's Alpha reliability analysis to assess the internal consistency of questionnaire items, a widely recognized measure of reliability.

Table 2

School Heads' Initiatives using Cronbach's Alpha Reliability Analysis

Sub-variables	Cronbach's Alpha	N of Items
A. Leading Strategically	0.789	5
B. Digital Infrastructure Requirements	0.826	5
C. Personal and Professional Development	0.982	5
D. Building Connection	0.801	5
E. ICT Skills Acquisition/Enhancement	0.951	5

Table 3

Teachers' Initiatives using Cronbach's Alpha Reliability Analysis

Sub-variables	Cronbach's Alpha	N of Items
A. Content Knowledge and Pedagogy	0.928	5
B. Teaching and Learning Practices/Readiness	0.833	5
C. Personal Growth and Professional Development	0.936	5
D. Community Linkages and Professional Engagement	0.915	5
E. Assessment and Reporting	0.933	5

Table 4

School and Climate using Cronbach's Alpha Reliability Analysis

Item Statements	Cronbach's Alpha	N of Items
School Climate	0.955	10
Classroom Climate	0.976	10

The reliability analysis, with a Cronbach's Alpha coefficient value exceeding 0.7, showed high internal consistency among survey questionnaire items. This suggests that all items in the questionnaire reliably measure the intended constructs related to school heads' and teachers' initiatives on Education 4.0 and for school and classroom climate.

To augment the qualitative data collection, the researcher formulated additional interview questions. Open-ended questions that are personally made by the researcher in accordance with the problems raised in the preceding chapter were asked through an interview.

Data Gathering Procedure

Prior to the conduct of the study, the researcher followed the usual procedures for conducting research. First, the researcher asked permission from the Schools Division Superintendent of Bulacan and the Schools Division Superintendent of the City of Baliwag to allow her to administer questionnaires to the public elementary schools of EDDIS II. Upon approval, the researcher distributed the questionnaires to the target respondents, composed of 52 school heads and 384 teachers from Baliwag North, Baliwag South, Bustos, and Plaridel Districts.

Two types of data were gathered: quantitative and qualitative data. Quantitative data were collected through the use of survey questionnaires. On the other hand, qualitative data were gathered by means of interviews. In the administration of questionnaires, respondents were given ample time to answer the questionnaire. Additionally, in the conduct of the interview, they were given the right to not answer the questions if they felt uncomfortable giving their insights as regards the topic.

These respondents were also given the assurance that all the data gathered from them was used solely for the completion of this study. After passing the final defense, which may happen in May 2024, all data stored on the researcher's laptop were permanently deleted, while the hard copy of the questionnaire were be destroyed through shredding.

Data Analysis

After collecting all the questionnaires, these were organized, tallied, tabulated, and analyzed using some statistical tools.

The mean was used to describe the (a) demographic characteristics of the school heads and teachers in terms of age, sex, civil status, highest education attainment, designation/position, and years in service; (b) school heads' and teachers' initiatives on Education 4.0 in terms of teaching and learning practices and readiness, digital infrastructure requirements, personal and professional development, building connections, and ICT skills acquisition and enhancement; and (c) school and classroom climate in terms of learning environment and diversity of learners, classroom management, curriculum delivery, and assessment and reporting.

A correlation analysis was performed to determine the relationship between the profiles of the school heads and teachers and teachers' initiatives on Education 4.0, as well as between the teachers' initiatives on Education 4.0 and school and classroom climate. It was also used to determine the difference between the school heads' and teachers' initiatives on Education 4.0.

For the gathered qualitative data, thematic analysis was used for interpretation. Thematic analysis is a method used in qualitative research to identify patterns or themes within the data. It involved organizing and interpreting data to uncover important or interesting patterns that could address research questions. It went beyond summarizing data by interpreting and making sense of it. The researcher closely examined the data to identify the common themes—topics, ideas, and patterns of meaning—that come up repeatedly. (Braun & Clarke, 2006).

Ethical Considerations

The study strictly considered the ethical provisions of the college and those of DepEd-Bulacan and the City of Baliwag. The respondents to this research were asked to sign an informed consent form, which stipulated that their participation was voluntary and that they were given the freedom to withdraw from their participation at any time they wanted and without any legal obligation. Also, the researcher protected the dignity and

anonymity of the participants and the schools that they represented. Further, the participants were also assured of the confidentiality of their responses.

After collecting the data from the respondents, the researcher tabulated and prepared the preliminary results for statistical analysis. Furthermore, responses in the survey were kept in full confidentiality, should only be used and processed by the researcher for the purposes of this research, and were subject to existing laws and regulations, such as the Data Privacy Act. The data collected was retained and used only for the period between March and May 2024. After the specified period, all data were securely deleted or destroyed in accordance with the data disposal procedures outlined in this policy.

To stress the implementation of Institute of Education Memorandum No. 9, s. 2022, the researcher destroyed the collected paper records containing the data by shredding the papers to leave no potential records prints, which may potentially be used for some unlawful and unethical undertakings that are not within the bounds of this present study.

CHAPTER III

RESULTS AND DISCUSSION

This chapter deals with the presentation, analysis and interpretation of the data collected and the results of the statistical treatment employed in the study with the purpose of analyzing the initiatives implemented by school heads and teachers in response to the Education 4.0 and assess their direct impact on the overall school and classroom climate.

The Demographic Characteristics

Demographic characteristics are quantifiable attributes that characterize a group of people and understand their composition and spread in geographical space or time. For this study, age, sex, civil status, highest educational attainment, position, and number of years in service were used. The characteristics of the school heads are presented in Tables 5–10, while the demographic characteristics of the teachers are shown in Tables 11–16.

Age

Age, a demographic trait defining life duration significantly influences experiences, habits, and societal responsibilities as individuals progress through life.

Table 5

Frequency and Descriptive Measures of School Heads' Demographic Characteristics in terms of Age

Age (Years)	F	%
55 and above	21	40.38
45 – 54	24	46.15
35 – 44	6	11.54
25 – 34	1	1.92
Total	52	100.00
Mean	52.00	
Standard Deviation	7.31	

It can be noted from Table 5 that almost the majority or 46.15 percent of the school head respondents belong to the age bracket of 45 to 54 years. On the other hand, only 1.92 percent belong to the age bracket of 25 to 34. A closer look at the table shows that the mean was registered at 52.00 while the standard deviation which measures the spread of the school heads' ages from the mean was recorded at 7.31.

This implies that the ages of the school heads are considerably widely dispersed. These results further indicate that most of the school heads' ages are in the middle age category.

In conjunction with the findings of the present study, the research conducted by Rivera and Ibarra (2020) in the District of Aliaga, Nueva Ecija, Philippines, concluded that age has a substantial influence on the leadership styles of school heads. With a mean age of 53.17 years old, the study indicates that older principals are more likely to take advantage of opportunities to learn, which can enhance their capacity to meet the demands of learners and teachers, ultimately improving the quality of education in schools, as what Education 4.0 is all about.

Sex

In this study, respondents were categorized based on their biological sex. One group consisted of males, while the other comprised females. This categorization facilitated the analysis of potential sex-based differences in the study outcomes, as reflected in Table 6.

Table 6

Frequency Distribution of School Heads' Demographic Characteristics
in terms of Sex

Sex	F	%
Male	12	23.08
Female	40	76.92
Total	52	100.00

It can be seen from the table that majority or 76.92 percent of the school heads are female and only 23.08 percent are male.

These results imply that female dominate the school head positions in public elementary schools of EDDIS II.

In accordance with the present findings, Adto-Morallos (2022) also found in her study that female school heads dominate the Pacific towns of Northern Samar, comprising 65.7% of the respondents, indicating a gender imbalance in leadership roles within the educational system in the province.

Civil Status

Civil status is the individual's legal relationship status in society, typically categorized as single, married, divorced, separated, or widowed. It indicates whether a person is legally recognized as being in a formal union, such as marriage, or not. Moreover, civil status can have implications for various legal, social, and professional matters, as shown in Table 7.

Table 7

Frequency Distribution of School Heads' Demographic Characteristics in terms of Civil Status

Civil Status	f	%
Single	4	7.69
Married	47	90.38
Widow	1	1.92
Total	52	100.00

It can be gleaned from the table that majority or 90.38 percent of the school head respondents are married during the conduct of the present research. Meanwhile, only 1.92 percent of these respondents are widow.

These results imply that most school heads in this marital trend could contribute to enhanced job performance and a more positive school atmosphere. However, it remains uncertain how this demographic detail interacts with the challenges and demands of implementing Education 4.0 initiatives. Future research could delve into whether and how

the marital status of school heads affects their ability to navigate the complexities of the modern educational landscape.

Accordingly, the study conducted by Misllang-Sison and Junio (2019) revealed that majority of the school heads in the towns of Pangasinan, Philippines are married with a mean of 41.25 and standard deviation of 3.65.

Highest Educational Attainment

The distribution of school head respondents when they are grouped according to highest educational attainment is manifested in Table 8.

Table 8

Frequency Distribution of School Heads' Demographic Characteristics
in terms of Highest Educational Attainment

Highest Educational Attainment	f	%
PhD/EdD	13	25.00
With units in PhD/EdD	13	25.00
MAEd	9	17.31
With units in MAEd	15	28.85
Bachelor's Degree	2	3.85
Total	52	100.00

It can be observed in the table that the majority of the school heads finished graduate studies; 28.85 percent of them have already earned some units in the Master of Arts in Education, while 17.31 obtained a MAEd degree. Meanwhile, 25 percent of these respondents earned units in doctorate degree, while 25 percent finished doctorate degree. On the other hand, only 3.82 percent of these respondents are just obtained bachelor's degree.

This implies that the vast majority of school heads have prioritized advanced education, with most having attained or pursued graduate-level degrees, indicating a strong commitment to professional development and expertise in educational leadership.

As concluded in the study by Adto-Morallos (2022), this significant number of school head-respondents obtained advanced education may equip them with the knowledge

and expertise needed to effectively lead schools and make informed decisions. Additionally, the commitment to ongoing learning through doctoral studies demonstrates a dedication to professional growth, which could enhance their effectiveness as educational leaders in the long term.

Position

The school head position refers to the individual responsible for overseeing the administration, management, and overall operations of a school. They play a crucial role in setting the vision, goals, and direction of the school, as well as ensuring the implementation of educational policies and practices. The distribution of the school head respondents when they are grouped according to position is presented in Table 9.

Table 9

Frequency Distribution of School Heads' Demographic Characteristics in terms of Position

Position	f	%
Principal IV	2	3.85
Principal III	5	9.62
Principal II	11	21.15
Principal I	13	25.00
Head Teacher III	14	26.92
Head Teacher I	7	13.46
Total	52	100.00

It can be gleaned from the table that 26.92 percent of the school head respondents are holding Head Teacher III positions. On the other hand, 3.85 percent of these respondents hold Principal IV positions. Further examination of the same table reveals that more than one-half, or 59.62 percent, of the respondents hold higher positions from Principal I to IV in public schools. Meanwhile, only 13.46 percent are in the lowest position.

Results showed that school heads holding higher positions may demonstrate superior performance, as related to the study by Aquino et al. (2021), which emphasized

that the dedication and motivation levels of school heads in higher positions may contribute to their enhanced administrative effectiveness.

Years in Service

The distribution of the school head respondents when they are classified according to years of service is presented in Table 10.

Table 10

Frequency and Descriptive Measures of School Heads' Demographic Characteristics in terms of Years in Service

Years in Service	*f*	%
21 and above	43	82.69
16 – 20	3	5.77
11 – 15	5	9.62
6 – 10	1	1.92
Total	52	100.00
Mean		21.46
Standard Deviation		3.63

It can be seen from the table that almost 82.69 percent of the school heads have been in the service for 21 years and older. On the other hand, only 1.92 percent have been in the service for 6 to 10 years. A close examination of the table shows that the mean was recorded at 21.46 years, while the standard deviation was calculated at 3.63 years.

This means that the length of service in years of the school head respondents is not spread out in relation to the mean. Further, it shows that the respondents are more senior in so far as length of service is concerned.

These results were consistent with the study of Dellomas and Deri (2022) about the extent of leadership practices of both elementary and secondary school heads in Bulan District, Division of Sorsogon Province, which suggested that as school heads prolong their services, they acquire a wealth of experience, knowledge, and skills in school administration.

Teachers

Teachers are essential professionals in the education system, shaping students' minds and futures. They provide quality education, support curriculum, and motivate students to reach their full potential, significantly impacting society. The demographic profile of the public elementary school teachers in terms of age, sex, teaching position, highest educational attainment, and years in service are presented in Tables 11 to 16.

Age

The concept of age describes how old a person is at a particular point in time. It is defined as the measure of the time elapsed from date of live birth to a specific point in time, usually the date of collection of the data.

Table 11

Frequency and Descriptive Measures of Teachers' Demographic Characteristics in terms of Age

Age (Years)	f	%
55 and above	40	10.42
45 – 54	125	32.55
35 – 44	130	33.85
25 – 34	88	22.92
Below 25	1	0.26
Total	384	100.00
Mean		42.49
Standard Deviation		9.45

It can be noted from Table 11 that 33.85 percent of teacher-respondents belonged to the age bracket of 35 to 44 years old. On the other hand, only 0.26 percent of these respondents belonged to the age bracket of 25 years and below. A closer look at the table shows that the mean age of the teacher researcher respondents was computed at 42.49 years, with a standard deviation of 9.45 years. This indicates that the ages of this group of respondents are spread out further from the mean.

Results show that teachers are predominantly in the middle adulthood stage, and their maturity level could impact their teaching styles, decision-making processes, and interactions with learners.

Sex

Sex refers to the biological and physiological characteristics that define humans as female or male.

Table 12

Frequency Distribution of Teachers' Demographic Characteristics in terms of Sex

Sex	f	%
Male	38	9.90
Female	346	90.10
Total	384	100.00

As Table 12 shows, the majority, or 90.10 percent, of the teacher respondents are female, while only 9.90 percent are male.

These results imply that female teachers dominate, outnumbering their male counterparts.

Results indicate that the gender distribution among teachers may influence the overall teaching dynamic and classroom environment. Moreover, it could potentially impact the perspectives, teaching styles, and interactions within the educational setting.

Civil Status

Civil status indicates whether a person is single, married, divorced, separated, widowed, or in a domestic partnership. It can have implications for legal rights, social benefits, and personal relationships. The distribution of the teacher respondents when they are classified according to civil status is presented in Table 13.

Table 13

Frequency Distribution of Teachers' Demographic Characteristics
in terms of Civil Status

Civil Status	*f*	%
Single	29	7.55
Married	349	90.89
Widow	6	1.56
Total	384	100.00

It can be observed from the table that the majority, or 90.89 percent, of teacher respondents are married. On the other hand, only 1.56 percent of these respondents are widowed.

These results imply that overwhelming majority of teacher respondents are married, while a very small percentage are widowed, suggesting a stable marital status among the teaching force. This marital status offer context to their personal and professional characteristics, potentially influencing their teaching competencies and approaches.

Accordingly, the study conducted by Flores (2019) revealed that the majority of the teachers in the Lone Districts in the Province of Batangas City Division of City Schools were married, accounting for 65.9%, followed by 31.7% who were single and 2.4% who were widowed.

Highest Educational Attainment

Educational attainment is the highest level of education, including diplomas, bachelor's, master's, or doctorates, reflecting an individual's formal qualifications and knowledge in various fields. The distribution of the teacher respondents when they are grouped according to highest educational attainment is manifested in Table 14.

Table 14

Frequency Distribution of Teachers' Demographic Characteristics
in terms of Highest Educational Attainment

Highest Educational Attainment	ƒ	%
PhD/EdD	2	0.52
With units in PhD/EdD	6	1.56
MAEd	43	11.20
With units in MAEd	213	55.47
Bachelor's Degree	120	31.25
Total	384	100.00

It can be observed in the table that the majority, or 55.47 percent, of the teacher respondents have already earned some units in the Master of Arts in Education. Meanwhile, only 0.52 percent of these respondents earned or finished doctorate degrees.

These results imply that a significant portion of teacher respondents are pursuing advanced education, with over half having earned some units in the Master of Arts in Education, while very few have attained a doctorate degree, indicating a focus on graduate-level coursework rather than doctoral studies.

Accordingly, the study conducted by Balanquit et al. (2023) revealed that educational attainment among teachers, particularly in terms of advanced degrees like master's and doctoral degrees, plays a crucial role in influencing learning outcomes and achievement.

Position

A teaching position is a job within an educational institution where an individual instructs students in a specific subject, facilitating learning, assessing progress, and creating a conducive learning environment for academic growth. These positions can vary in terms of academic rank based on experience and qualifications. The distribution of the teacher-researcher and non-researcher respondents when they are grouped according to teaching position is presented in Table 15.

Table 15

Frequency Distribution of Teachers' Demographic Characteristics in terms of Position

Position	ƒ	%
Master Teacher II	14	3.65
Master Teacher I	25	6.51
Teacher III	155	40.36
Teacher II	33	8.59
Teacher I	157	40.89
Total	384	100.00

It can be presupposed from the table that most, or 40.89 percent, of the teacher respondents are holding Teacher I position, with a closer value of 40.36 percent with respondents holding Teacher III position. On the other hand, 3.65 percent of these teachers are holding Master Teacher II positions.

Further examination of the same table reveals that more than one-half, or 59.11 percent, of the respondents are holding higher positions than Teacher I in teaching in public schools.

This implies that while many teachers are in the early stages of their careers, a significant number have progressed to higher positions, showing a trend of career advancement in public elementary schools.

Results showed that they were related to the study of Padillo et al. (2021), which assessed the quality of instruction and professional development activities in a well-known university in Cebu, which suggests that teachers' mastery of the subject matter, length of teaching experience, and educational qualifications significantly influence their teaching positions.

Years in Service

Years in service refers to the duration of a teacher's active employment in education, indicating their experience and influence on their professional growth, expertise, and classroom effectiveness, often used as a measure of tenure. The distribution of the teacher respondents when they are classified according to years in service is presented in Table 16.

Table 16

Frequency and Descriptive Measures of Teachers' Demographic Characteristics in terms of Years in Service

Years in Service	f	%
21 and above	100	26.04
16 – 20	67	17.45
11 – 15	63	16.41
6 - 10	106	27.60
5 years and below	48	12.50
Total	384	100.00
Mean		13.85
Standard Deviation		7.01

It can be seen from the table that 27.60 percent of the teachers have been in the service for 6 to 10 years. On the other hand, only 12.50 percent have been in the service for 5 years and below. A close examination of the table shows that the mean is recorded at 13.85 years, while the standard deviation was calculated at 7.01 years.

This implies that there's a mix of experienced and newer teachers, with many having worked for 6 to 10 years, indicating they're gaining experience but are still early in their careers. The average tenure of around 13.85 years shows that, overall, the teaching staff is stable and has been in their roles for a considerable time.

These results are consistent with the study of Bogo and Aperocho (2023) about the relationship between the teachers' competence and students' academic achievement in Davao City National High School, which revealed that teachers with over 20 years of experience were generally more effective than those with no experience, but not significantly more effective than those with 5 years. The study also highlighted a potential decline in teaching effectiveness after certain points.

The School Heads' Initiatives on Education 4.0

In this study, the school heads' initiatives on Education 4.0 are grouped into five dimensions or indicators: leading strategically, digital infrastructure requirements, personal and professional development, building connections, and ICT skills acquisition and enhancement.

Leading Strategically

Among the different dimensions indicating the school heads' initiatives on Education 4.0, the first one indicator is Leading Strategically. Leading Strategically is composed of five (5) indicators, too.

As shown in Table 17, statement No. 2 "shares with fellow school heads best practices in the development and implementation of school plans aligned with initiatives for Education 4.0, such as digitization of transactions, etc." and statement No. 5, "monitors teachers' initiatives on Education 4.0 through technologies and collaborative, flexible, and personalized pedagogical approaches in updating teaching methods toward increasing the effectiveness of teaching-learning", both got the highest mean of 4.63 (Strongly Agree).

On the contrary, their lowest mean score is for statement No. 4 "integrates the development of technology to support real-time decision-making through Cyber-Physical Systems (CPS), Internet of Things (IoT), among others at 4.54 (Strongly Agree), still within the ' Strongly Agree ' range but suggesting a slightly lower proficiency compared to other areas.

Table 17

The School Heads' Initiatives on Education 4.0 in terms of Leading Strategically

Item Statement *The school head as an initiator of Education 4.0 …*	Mean	VD
1. serves as benchmarkee in communicating the DepEd initiatives on Education 4.0	4.58	SA
2. shares with fellow school heads best practices in the development and implementation of school plans aligned with initiatives for Education 4.0, such as digitization of transactions, etc.	4.63	SA
3. promotes a culture of training soft and hard key competencies on Education 4.0	4.62	SA
4. integrates the development of technology to support real-time decision-making through Cyber-Physical Systems (CPS), Internet of Things (IoT), among others	4.54	SA
5. monitors teachers' initiatives on Education 4.0 through technologies and collaborative, flexible, and personalized pedagogical approaches in updating teaching methods toward increasing the effectiveness of teaching-learning	4.63	SA
Overall Mean	4.60	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

These results imply that the school heads' initiatives on Education 4.0 through Leading Strategically highlighted their dynamic roles as people managers imbued with ICT-based skills as indicated in the overall weighted mean of 4.60 which falls under "Very High" or "Strongly Agree" verbal description. This also means that there is a strong consensus among school head-respondents regarding the importance of sharing best practices and monitoring teachers' initiatives in Education 4.0.

These findings align with Raksanakorn et al.'s (2022) study, which emphasizes the importance of enhancing leadership attributes among school heads, particularly in areas such as leadership skills, academic leadership, and new-age skills, to initiate development in Education 4.0. Similarly, they resonate with Domain 1 of the Philippine Professional Standards for School Heads, which highlights the role of school heads in setting direction, goals, and objectives for the school, ensuring alignment with stakeholders, and responding effectively to evolving needs through strategic action. Mudgil's (2021) study also supports these findings, indicating that effective leadership, particularly in leading strategically, is crucial for navigating change and successfully implementing Education 4.0 initiatives in schools, ultimately contributing to school improvement efforts.

In the conducted interview, a participant stated "*Education 4.0 plays a crucial role in transformational leadership. School leaders need to empower themselves and their teachers with various leadership skills to effectively implement the Education 4.0 strategies.*"

Digital Infrastructure Requirements

In this study, the domain of Digital Infrastructure Requirements encompasses five indicators, reflecting school heads' initiatives on Education 4.0. These indicators highlight how school heads introduce, implement, and sustain digital transformation at the school level, incorporating emerging digital technologies and innovative techniques to bring about

organizational change and integrate digital infrastructures effectively.

Table 18

The School Heads' Initiatives on Education 4.0 in terms of Digital Infrastructure Requirements

Item Statement *The School Head initiates Education 4.0 through enhancing ICT-based development that…*	Mean	VD
1. provides a learning environment that takes charge of the ICT needs of both teachers and learners.	4.63	SA
2. provides strong internet connection which is accessible both for teachers and learners.	4.54	SA
3. offers available teaching spaces with flexible layouts, equipped with technology that enables learners and staff to connect to screens wirelessly for collaboration.	4.46	SA
4. provides digital infrastructure which provides open access to scientific data and knowledge, further commercialization of research, innovation, products, and services.	4.40	SA
5. provides computer laboratory with internet connection in which learners can watch educational videos and collaborate with other learners	4.21	SA
Overall Mean	4.45	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

As shown in the table above, Item No. 1, "The School Head initiates Education 4.0 through enhancing ICT-based development that provides a learning environment that takes charge of the ICT needs of both teachers and learners" gained the highest weighted mean of 4.63 with a verbal description of Strongly Agree. This shows that school heads are able to provide both teachers' and learners' needs when it comes to ICT input.

Meanwhile, the item with the lowest weighted mean of 4.21 is Item No. 5, "The School Head initiates Education 4.0 through enhancing ICT-based development that provides computer laboratory with internet connection in which learners watch educational videos and collaborate with other learners", yet, with a verbal description of "Strongly

Agree", too. The overall computed mean for the table is 4.45, also with a verbal description of "Strongly Agree".

These results imply that the school heads are highly effective in meeting both teachers' and learners' ICT needs in their respective schools. Overall, the table indicates strong support for Education 4.0 initiatives, with an overall mean of 4.45 falling under "Strongly Agree."

This reality was further cited by Oliveira and de Souza (2016) wherein Digital Infrastructure Development according to Schleicher (2016) states that teachers must use digital technologies in teaching and understand the accelerated development of the fields of diverse knowledge.

In accordance with these findings, Education 4.0 seeks to equip learners with the skills necessary for 21st -century learning and work and prepare them to act on relevant social challenges as the UN Sustainable Development Goals (SGD) (UN, 2015) proclaimed. Hence, the School heads' initiatives on Education 4.0 in terms of Digital Infrastructure Requirements contribute to the growing demands of making learning flexible and adaptive to changes brought by the modern world wherein "all countries start learning online and applying technology in education" as cited by Elayyan in his study The Future of Education According to the Fourth Industrial Revolution (2021).

Statements worth revealing in relation to this finding include*," Education 4.0 is a facility that allows the use of advanced technologies. It is a digital rise program in an educational framework that anchors on the infrastructure, software, and capacity building of learners and teachers in technology".*

Personal and Professional Development

The School Heads' Initiatives on Education 4.0 in terms of Personal and Professional Development have also five (5) indicators.

Table 19 shows the School Heads' initiatives on Education 4.0 in terms of Personal and Professional Development.

Table 19

The School Heads' Initiatives on Education 4.0 in terms of Personal and Professional Development

Item Statement *The implementation of Education 4.0 is evident in the school through each initiative wherein the School Head…*	Mean	VD
1. sets personal and professional development goals based on self-assessment aligned with digital citizenship.	4.69	SA
2. implements the performance management system with a team to support the career advancement of school personnel, and to improve digital citizenship performance.	4.71	SA
3. implements professional development initiatives to enhance strengths and address performance gaps with digital citizenship.	4.69	SA
4. provides opportunities to individuals and teams in performing leadership roles and responsibilities towards digital citizenship.	4.73	SA
5. possesses a strong understanding of available digital capabilities in enhancing teaching and learning in the digital era.	4.62	SA
Overall Mean	4.69	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

Table 19 shows that the item statement no. 4 "The School Head provides opportunities to individuals and teams in performing leadership roles and responsibilities towards digital citizenship" garnered the highest weighted mean of 4.73 while item statement No. 5 "possesses a strong understanding of available digital capabilities in enhancing teaching and learning in the digital era" got the lowest weighted mean of 4.62, both with corresponding verbal description of "Strongly Agree.". In the same manner, all the indicators had a weighted average mean of 4.69.

Furthermore, it is noteworthy to mention that among the five areas of initiatives on Education 4.0 provided by School Heads, the School Heads' Initiatives on Education 4.0 in terms of Personal and Professional Development had the highest weighted mean.

This implies that school heads are particularly successful in fostering leadership and digital citizenship among individuals and teams, as well as emphasizing personal and

professional development within the context of Education 4.0. While their understanding of digital capabilities to enhance teaching and learning received slightly lower scores, it still reflects strong agreement. Overall, school heads demonstrate a robust commitment to advancing Education 4.0 initiatives, indicating their proactive role in integrating modern educational practices.

In accordance with this, according to Stephens (2022), professional development can give school heads the skills and experience they need to take on more tasks and higher duties. He also adds that personal development, on the other hand, improves personal aspects of life but also helps increase one's knowledge and furthers one's career because doing so makes one a productive employee.

Parallel to these findings, Ozturk (2021) states that School Heads as team leaders in initiating Education 4.0 should oversee the functionality of a workgroup by providing guidance and instruction on digital citizenship. He further defined digital citizenship as the online display of behaviors that ensure the legal, safe, ethical and responsible use of information and communication technologies, which is considered to be the digital tools of this generation that use technology extensively on daily basis, for it is necessary for them to be prepared in communicating and collaborating safely and responsibly in online environments. As such,

Hence, School Heads who have initiatives on both personal and professional development of both their teachers and learners give importance to using digital tools (Fingal, 2020) as cited by Ozturk (2021). Since both School Heads, teachers, and learners use technology intensively on daily basis, the need for training them in a way to establish safe online communication and collaboration has put the concept of digital citizenship on the agenda and make personal and professional development as one of the crucial initiatives in establishing and developing Education 4.0 as explained by Ozturk, (2021).

In the same light, during the conducted interview, one of the School Head-participants enthused: "*The process of implementing Education 4.0, though, is not easy, it is, however, possible and necessary, through personal and professional development initiatives. Education 4.0 is a way for us to upgrade our strategies in teaching -learning*

process, thus through the help of stakeholders in upgrading our facilities and equipment and through intensive trainings of teachers Education 4.0 will soon realize its goals".

Building Connections

The indicators component of Building Connections consists of five -item statements. The School Heads' Initiatives on Education 4.0 in terms of Building Connections is shown in Table 20.

Table 20

The School Heads' Initiatives on Education 4.0 in terms of Building Connections

Item Statement *The School Head builds connections for the attainment of Education 4.0 through each initiative as he/she…*	**Mean**	**VD**
1. builds constructive relationships with authorities, colleagues, parents, and other stakeholders to foster an enabling and supportive environment for learners' digital citizenship.	4.65	SA
2. manages school/classroom organizations, such as learner organizations, faculty clubs and parent- teacher associations, by applying relevant policies and guidelines to support the attainment of digital citizenship.	4.65	SA
3. communicates effectively with teachers, learners, parents, and other stakeholders, through positive use of communication platforms, to facilitate digital citizenship.	4.75	SA
4. initiates partnerships with the community, such as parents, alumni, authorities, industries, and other stakeholders, to strengthen support for digital citizenship.	4.56	SA
5. develops digital skills across the organization through professional development programs.	4.54	SA
Overall Mean	4.63	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

Table 20 shows that among the five item statements, the highest weighted mean was obtained by item statement no 3 which states that "The School Head communicates

effectively with teachers, learners, parents, and other stakeholders, through positive use of communication platforms to facilitate digital citizenship" which garnered a weighted mean of 4.75.

Meanwhile, item statement no. 4, "The School Head develops digital skills across the organization through professional development programs," received a weighted mean of 4.54, the lowest among the five indicators, though, it also falls under the verbal description of "strongly agree."

Moreover, all of the five items obtained weighted mean which are under the verbal description of "Strongly Agree".

These results indicate that school heads have already established good and sustainable relationship with all types of both internal and external stakeholders of their respective schools.

Parallel to these findings, the Domain 5 of the Philippine Professional Standards for School Heads (PPSSH) under Building Connections (DepEd Order no. 24, 18-19, s. 2020) puts premium to the school heads' commitment in advocating that education is everyone's responsibility.

In fact, among the five areas of initiatives of School Heads regarding Education 4.0, the area of Building Connections is one of the most important because, in this Domain, School Heads engage stakeholders in initiatives towards the improvement of school communities. They are responsible and accountable for inculcating a deeper understanding of the vision, mission and core values and directions of the school to relevant entities. They possess skills in relating with, dealing with, and in forging relationships with people. They build relationships with individuals and organizations anchored on mutual trust, honesty, openness, respect and commitment towards sharing the same vision for the attainment of institutional goals (DepEd Order No. 24, 2,18-19, 2020).

Furthermore, School Heads possess people leadership that makes them have the ability to work and develop effective relationships with stakeholders and exert positive influence upon their people wherein they are regarded as stewards of schools to be competent in management of their schools and in building connections among

stakeholders, most particularly their teachers (DepEd Order No. 12, 10-15, 2020) as cited by Cruz (2020).

In addition, School Heads' building connections' initiatives on Education 4.0 include the following areas: communication and community engagement which only further proves the crucial role that all school heads play in the lives of their teachers and learners as explained by Nazareth (2021).

In this connection, Montealegre (2019) states that there is a need to build an education system that involves not only the schools to take care of the education of our children, but also a strong support from the business sector, the community and the parents. As the saying goes: "It takes a village to educate a child."

In the conducted interview, a participant voiced out: *"As School Heads, we should always be mindful of how we communicate effectively with teachers, learners, parents, and other stakeholders in these modern times. Through positive use of communication platforms, such as official FB page, and the like, we can facilitate the development of digital citizenship among our various stakeholders…and these things are very important in order to implement Education 4.0 in our respective schools*."

ICT Skills Acquisition /Enhancement

One of the crucial predictors of school heads' competence as 21st-century leaders nowadays is their capacity to integrate ICT skills in their day-to-day management and supervision.

Hence, to ensure that the education ecosystem constantly stays dynamic and relevant, Education 4.0 has been developed in response to the Fourth Industry Revolution. As such, the School Heads' initiatives on Education 4.0 in terms of ICT skills acquisition/enhancement calls for a radical, technology-based teaching and learning method.

Table 21

The School Heads' Initiatives on Education 4.0 in terms of ICT Skills Acquisition /Enhancement

Item Statement *The School Head acquired and enhanced skills in Education 4.0 are manifested through each initiative wherein he/she…*	Mean	VD
1. enhances the coordination of education resources through the use of ICT devices.	4.62	SA
2. enhances proper keeping of records for efficient management of educational resources through the use of ICT devices.	4.65	SA
3. enhances effective communication in the school system for efficient management of educational resources through the use of ICT devices.	4.69	SA
4. enhances proper accountability of educational resources in the school system through the use of ICT devices.	4.73	SA
5. enhances efficient management of educational resources through proper utilization of ICT devices in sourcing for information useful for the maintenance of educational resources.	4.75	SA
Overall Mean	4.69	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

Table 21 displays the School Heads' initiatives on Education 4.0 in terms of ICT skills acquisition/enhancement which clearly indicate that all the weighted mean fall under the verbal description of "Strongly Agree" which means that the school heads' perceived themselves to be "Very High" in the aforementioned indicators.

With an overall weighted mean of 4.69, the item statement which received the highest mean is Item No. 5: The School Head acquired and enhanced skills in Education 4.0 are manifested through each initiative wherein he/she enhances efficient management of educational resources through proper utilization of ICT devices in sourcing for information useful for the maintenance of educational resources, with weighted mean of 4.75.

Though all of the five-item-statements obtained verbal description of "Strongly Agree" or "Very High", it was observed that item statement no. 1: enhances the coordination of education resources through the use of ICT devices, with corresponding weighted mean of 4.62, got the lowest rating, which is actually still higher weighted average compared to all other indicators among the five domains.

These results imply that school heads have been giving this indicator: ICT Skills Acquisition/Enhancement its proper due importance. Overall, this demonstrates a strong confidence among school heads in their ICT capabilities and their effectiveness in leveraging these skills for Education 4.0 initiatives.

These findings are in line with Kin et al.'s (2022) study, which emphasizes the importance of technological and digital competency for both school heads and teachers in the era of Education 4.0. This competency includes the ability to handle data, manage information processes efficiently, integrate ICT into daily management, and effectively supervise blended learning, including virtual or online classes.

In the conducted interview with the School Head-respondents, they were asked: "*How do your teachers implement the curriculum in accordance with Education 4.0.*"? majority of them replied that their teachers show willingness to know more and embrace Education 4.0 through the following ways: *(1) Teachers use technology integration into their teaching methods; (2) Teachers use the student centered- learning; (3) Teachers develop 21st century skills that are essential for the future workplace; (4) They contextualize learning where teachers can leverage technology to deliver personalized learning experiences; and (5) Real world connections, lifelong learning, collaborative learning and data- driven decision making are implemented by the teachers.*

The Teachers' Initiatives on Education 4.0

Teachers' initiatives on Education 4.0 encompass a multifaceted approach aimed at leveraging technology and innovative teaching methodologies to adapt to the demands of the digital age. Educators in Education 4.0 are utilizing digital tools like AI, VR, and interactive platforms to enhance student learning and improve digital literacy, adopting a personalized, student-centered approach based on data-driven insights.

The assessments of the Teachers' Initiatives on Education 4.0 of the public elementary school teachers in terms of content knowledge and pedagogy, teaching and learning practices/readiness, personal growth and professional development, community linkages and professional engagement, and assessment and reporting are presented in Tables 22 to 26.

Content Knowledge and Pedagogy

Content knowledge refers to a teacher's comprehensive understanding of a subject, including facts, concepts, principles, and theories. Pedagogy, on the other hand, involves strategies and methods used to facilitate learning and instruction, including lesson planning, classroom management, assessment techniques, and instructional practices to engage and support students.

The Teachers' Initiatives on Education 4.0 of the public elementary school teachers in terms of content knowledge and pedagogy is presented in Table 22.

Table 22

The Teachers' Initiatives on Education 4.0 in terms of Content Knowledge and Pedagogy

Item Statement *The teacher as an initiator of Education 4.0 …*	Mean	VD
1. applies knowledge of content on ICT-based instruction	4.41	SA
2. ensures the positive use of ICT to facilitate the teaching and learning process	4.51	SA
3. integrates ICT into the teaching-learning process	4.50	SA
4. engages learners in meaningful exploration, discovery, and hands-on technological advances on Education 4.0 (E4)	4.42	SA
5. conducts more studies that propose solutions to overcome the technological challenges in teaching E4	4.29	SA
Overall Mean	4.43	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

Table 22 shows that teachers are proactive in using ICT to enhance teaching and learning, with the highest mean score of 4.51 for ensuring the positive use of ICT. The lowest mean score is 4.29 for conducting studies to overcome technological challenges, indicating slightly lower proficiency but still within the "Strongly Agree" range. With an overall mean score of 4.43, all items are rated "Strongly Agree," highlighting the importance of effectively integrating ICT into teaching. This integration can boost student engagement, provide interactive learning experiences, and support diverse learning styles, fostering a dynamic classroom environment that enhances student achievement. By using innovative technologies and digital tools, teachers can cultivate curiosity, critical thinking, and problem-solving skills, preparing students for a technology-rich future.

This implies that teachers are highly proficient in using ICT to enhance the teaching and learning process, though they may need to improve on conducting studies to address technological challenges. The strong overall agreement underscores the importance of integrating ICT to engage learners, provide interactive learning experiences, and support diverse learning styles, ultimately preparing learners for a technology-rich future.

Manigbas et al. (2024) stress the vital role of teachers' competencies in content knowledge and pedagogy within Education 4.0, highlighting the need for educators to effectively integrate technology into teaching to enhance student learning outcomes. They also emphasize the importance of ongoing professional development to empower teachers in adapting to the digital demands of Education 4.0.

Similarly, Refugio et al. (2020) support the integration of technology and personalized learning, emphasizing the significance of teachers' strong content knowledge in enhancing these aspects. By focusing on improving teachers' content knowledge, their study contributes to preparing educators to effectively navigate the digital age and provide quality education aligned with the principles of Education 4.0.

Teaching and Learning Practices/Readiness

Teaching and Learning Practices/Readiness refers to the methods, strategies, and approaches used by teachers to present educational information and facilitate learning. It involves instructors' ability to effectively use technology, adapt to online teaching

environments, and engage in ongoing professional development to improve their teaching skills and boost learners' learning outcomes.

The Teachers' Initiatives on Education 4.0 of the public elementary school teachers in terms of teaching and learning practices/readiness is presented in Table 23.

Table 23

The Teachers' Initiatives on Education 4.0 in terms of Teaching and Learning Practices/Readiness

Item Statement *The teacher as an initiator of Education 4.0 …*	Mean	VD
1. uses strategies in the delivery of instruction like augmented and virtual reality, problem and inquiry-based teaching and learning, and gamification and simulation.	4.35	SA
2. utilizes technology-based assessment tools. (ex. Kahoot, Quizlet)	4.14	A
3. teaches digital citizenship (technology ethics, social, ethical, and legal responsibilities in the use of technology tools and resources, etc.)	4.33	SA
4. attends seminars and conferences to enhance technological and pedagogical skills.	4.38	SA
5. shows skills in learning management system, google classroom, and online class modality.	4.31	SA
Overall Mean	4.30	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

Table 23 illustrates the initiatives on education 4.0 of public elementary school teachers concerning teaching and learning practices/readiness. The teachers rated the highest mean score for " The teacher as an initiator of Education 4.0 attends seminars and conferences to enhance technological and pedagogical skills." at 4.38 (Strongly Agree), indicating a highly proficient ability in this aspect. Conversely, their lowest mean score is for " The teacher as an initiator of Education 4.0 utilizes technology-based assessment tools. (ex. Kahoot, Quizlet)." at 4.14 (Agree), within the 'Agree' range but suggesting a

slightly weaker competency compared to other areas. Overall, the teachers responded mostly with 'strongly agree' to all items.

It can be seen that the overall mean is at 4.30 (Strongly Agree), indicating a strong initiative in integrating Education 4.0 in teaching and learning practices/readiness.

This suggests that public elementary school teachers are actively engaging in professional development opportunities to enhance their technological and pedagogical skills, as indicated by their high rating for attending seminars and conferences. However, their slightly lower score for utilizing technology-based assessment tools implies a potential area for improvement, although overall, their strong agreement reflects a commitment to integrating Education 4.0 principles into their teaching practices.

In this connection, Saro et al. (2022) suggested that teachers must actively participate in seminars and conferences to improve both technological and pedagogical skills. This proactive approach demonstrates a commitment to staying updated on advancements in education and integrating innovative teaching methods into practice. By engaging in professional development opportunities, the individual aims to enhance their teaching effectiveness and adaptability to the evolving educational landscape shaped by technology and pedagogy.

Nueva (2019), on the other hand, highlights the importance of teachers using a variety of technological tools to improve their teaching techniques, including as PowerPoint presentations, web-based apps, tablets, iPads, mobile devices, social media platforms, virtual classrooms, and educational games. These technologies have a variety of applications in the classroom, including instructional support, information retrieval, and communication and collaboration platforms.

Personal Growth and Professional Development

Personal growth for teachers includes the development of personal strengths, life skills, and self-awareness in order to effectively balance professional and personal responsibilities, handle stress, and make wise judgments. It improves self-concept, self-esteem, and self-confidence, promoting emotional well-being and a strong sense of self. Professional development, on the other hand, entails ongoing learning through activities

such as attending workshops, seminars, and additional studies in order to stay current with educational breakthroughs, improve teaching practices, and positively impact student learning results. Personal and professional development are essential for teachers to flourish in their careers, adapt to changing educational landscapes, and give high-quality education to their pupils.

The teachers' initiatives on education 4.0 of the public elementary school teachers in terms of personal growth and professional development is presented in Table 22.

Table 24

The Teachers' Initiatives on Education 4.0 in terms of Personal Growth and Professional Development

Item Statement *The teacher initiates Education 4.0 as s/he…*	Mean	VD
1. sets professional development goals aligned with Education 4.0.	4.53	SA
2. participates in collegial discussions that use teaching and learner feedback to enrich teaching practices manifesting E4.	4.48	SA
3. organizes and uses appropriate teaching and learning resources including ICT.	4.47	SA
4. addresses learning goals that support Education 4.0	4.47	SA
5. uses E4 approaches in reflecting one's career growth.	4.33	SA
Overall Mean	4.46	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

Table 24 outlines the initiatives on Education 4.0 of public elementary school teachers regarding personal growth and professional development. Among the items, the highest mean score is for " The teacher initiates Education 4.0 as s/he sets professional development goals aligned with Education 4.0. " at 4.53 (Strongly Agree), indicating a highly proficient initiative in this aspect. Conversely, their lowest mean score is for " The teacher initiates Education 4.0 as s/he uses E4 approaches in reflecting one's career growth." at 4.33 (Strongly Agree), still within the 'Strongly Agree ' range but suggesting a

slightly weaker competency compared to other areas. With the overall mean of 4.46, the teachers responded 'strongly agree' to all items.

These results suggest that public elementary school teachers are actively engaging in personal growth and professional development aligned with Education 4.0, particularly in setting development goals. However, there may be room for improvement in integrating Education 4.0 approaches into reflecting on career growth. Overall, the teachers' strong agreement with all items indicates a strong commitment to advancing their skills and knowledge within the Education 4.0 framework.

In line with the current findings, Ancho and Arrieta (2021) underscored the significance of incorporating Education 4.0 principles, such as technology integration and collaborative learning, to support teachers' professional development and improve student outcomes in the digital age.

Similarly, Aquino et al.'s (2022) study on Filipino teachers' personal and professional development goals identified three major themes: professional growth, school-stakeholder connections, and improved student academic accomplishment. Teachers sought to complete master's degrees, increase their financial security, and advance to higher posts. The study employs E4 techniques to reflect career advancement, highlighting the significance of ongoing professional development for improved academic performance and student achievement. Teachers want to increase education, strengthen stakeholder connections, and prioritize student academic achievement.

In the course of the interview, the teacher respondents were asked, *"Do you see yourself as a good facilitator of Education 4.0?"*, the majority of them responded that *for teachers to become effective facilitators of Education 4.0, they must be committed to constant learning, adaptable, and have a true enthusiasm for guiding students through the digital age. Teachers are constantly eager to learn and improve themselves because they value the unique viewpoints and contributions that learners will contribute during the learning process. To be an effective Education 4.0 facilitator, you must be committed to constant learning, adaptable, and have a genuine desire to guide students as they navigate the digital world.*

Community Linkages and Professional Engagement

Community linkages and professional engagement are the collaborations between teachers, schools, and the wider community to create learning environments that are responsive to community contexts. It involves engaging parents and stakeholders in the educational process, promoting professional ethics, and complying with school policies and procedures. This collaboration is essential for schools to meet the needs of society and vice versa, fostering a strong partnership between all stakeholders, both internally and externally.

The Teachers' Initiatives on Education 4.0 of the public elementary school teachers in terms of community linkages and professional engagement is presented in Table 25.

Table 25

The Teachers' Initiatives on Education 4.0 in terms of Community Linkages and Professional Engagement

Item Statement *The teacher initiates Education 4.0 as s/he…*	Mean	VD
1. participates in professional networks to share knowledge on digital citizenship.	4.37	SA
2. enhances practice to disseminate information on digital citizenship in wider school community.	4.36	SA
3. facilitates involvement in the educative process aligned with digital citizenship.	4.33	SA
4. strengthens support with stakeholders regarding digital citizenship.	4.39	SA
5. communicates promptly the learners' achievement to key stakeholders, including parents and guardians using ICT-based platforms.	4.43	SA
Overall Mean	4.38	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

Table 25 depicts the initiative on Education 4.0 of public elementary school teachers in community linkages and professional engagement. Teachers rated the highest

mean score is for "The teacher initiates Education 4.0 as s/he communicates promptly the learners' achievement to key stakeholders, including parents and guardians using ICT-based platforms." at 4.43 (Strongly Agree), indicating a competent initiative in this feature. On the contrary, their lowest mean score is for "The teacher initiates Education 4.0 as s/he facilitates involvement in the educative process aligned with digital citizenship." at 4.33 (Strongly Agree), still within the ' Strongly Agree ' range but suggesting a slightly weaker initiative compared to other areas. Overall, the teachers responded 'strongly agree' to all items. with an overall mean of 4.38 and a verbal description of 'strongly agree,'

These results indicate that public elementary school teachers are adept at promptly communicating learners' achievements to stakeholders using ICT-based platforms, reflecting their strong competency in this aspect of Education 4.0. However, the slightly lower score for facilitating involvement in the educative process aligned with digital citizenship suggests a potential area for growth. Overall, while teachers demonstrate a strong commitment to community engagement and professional involvement, there may be opportunities for further improvement in integrating digital citizenship principles into their educational initiatives.

These findings align with Gepila's (2020) study which highlights the importance of fostering collaboration between schools and the community to effectively address societal needs. The role of teachers as effective collaborators and community-builders is emphasized, emphasizing the significance of enhancing community linkages and professional engagement for mutual growth and advancement in the educational process. Similarly, Saro et al. (2022) stress the significance of community linkages and professional engagement. They found that fostering a sense of community in the classroom and encouraging critical thinking among students were highly satisfying aspects. Additionally, incorporating technology to actively engage students and promote critical thinking was noted as valuable. Overall, both studies underscore the importance of collaborative efforts among educators, students, and parents to create a conducive learning environment.

Assessment and Reporting

In Education 4.0, assessment methods may include adaptive learning platforms, artificial intelligence, and data analytics to provide personalized feedback and insights into students' progress. Reporting in Education 4.0, on the other hand, focuses on utilizing digital platforms and interactive dashboards to communicate assessment results in real-time, enabling stakeholders to make data-driven decisions to support student learning and development effectively in the digital age.

The Teachers' Initiatives on Education 4.0 of the public elementary school teachers in terms of content knowledge and pedagogy is presented in Table 26.

Table 26

The Teachers' Initiatives on Education 4.0 in terms of Assessment and Reporting

Item Statement *The teacher initiates Education 4.0 as s/he…*	Mean	VD
1. designs and selects assessment tools consistent with E4 goals.	4.30	SA
2. takes relevant steps to solve learners' problem applying E4.	4.33	SA
3. prepares assessment based on E4 technologies in education.	4.32	SA
4. applies E4 in assessing and reporting learners' achievement.	4.34	SA
5. monitors and evaluates learner progress and achievement using ICT-based tools	4.37	SA
Overall Mean	4.33	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – Very High   1.81 – 2.60 Disagree (D) – Low

3.41 – 4.20 Agree (A) – High   1.00 – 1.80 Strongly Disagree (SD) – Very Low

2.61 – 3.40 Moderately Agree (MA) – Average

In Table 26, the initiative on Education 4.0 of public elementary school teachers in assessment and reporting is outlined. Among teachers, the highest mean score is for "The teacher initiates Education 4.0 as s/he monitors and evaluates learner progress and achievement using ICT-based tools." at 4.37 (Strongly Agree), indicating a highly proficient initiative in this aspect. Conversely, their lowest mean score is for " The teacher initiates Education 4.0 as s/he designs and selects assessment tools consistent with E4

goals." at 4.30 (Strongly Agree), still within the ' Strongly Agree ' range but suggesting a slightly weaker initiative compared to other areas. Overall, the teachers responded 'strongly agree' to all items with an overall mean of 4.33.

These findings suggest that public elementary school teachers excel in utilizing ICT-based tools to monitor and evaluate learner progress within Education 4.0, indicating a strong proficiency in this aspect. However, there is a slight opportunity for improvement in aligning assessment tools with the goals of Education 4.0, highlighting an area for potential growth. Overall, while teachers demonstrate a strong commitment to effective assessment and reporting practices, there is potential to enhance the alignment of assessment strategies with the principles of modern education.

In accordance with these findings, Sarmiento et al. (2020) conducted a study on assessment practices which emphasizes the role of assessment practices in preparing students for careers, supporting instruction, and promoting collaborative and reflective assessment methods. Recommendations include standardizing industry partnerships and enhancing assessment literacy among educators to better align with industry demands and improve student outcomes.

In conjunction with these findings, Rural (2020) in her study, underscores the importance of enhancing teachers' assessment skills, particularly in effectively utilizing assessment data to improve instructional practices. The study suggests implementing capacity-building programs and workshops for teachers to enhance their assessment competencies. Additionally, it emphasizes the need for teacher training institutions to prioritize educational assessment in their curricula and for policymakers to focus on developing student assessment skills during pre-service training.

The School Climate

School climate is a multidimensional concept that includes perceptions of safety, engagement, and the academic and physical environment. This study uses 10 indicators to assess how the initiatives of school heads and teachers in Education 4.0 affect the overall school climate.

Table 27

Respondents' Assessments on School Climate

Item Statement *The school…*	School Head		Teacher	
	Mean	**VD**	**Mean**	**VD**
1. provides a sense of vision, and a mission aligned with Education 4.0 initiatives that are shared by all personnel.	4.62	SA	4.47	SA
2. offers quality instruction and offers support services to all types of students.	4.65	SA	4.52	SA
3. engages in "authentic learning" activities wherein the teachers make learners responsible for their own learning through the teachers' efficient and updated ICT-based instruction aligned with Education 4.0 initiatives.	4.79	SA	4.41	SA
4. sustains effective supports for students needing alternative modes of communication (e.g., manual signs, communication boards, computer-based devices, picture exchange systems, Braille).	4.69	SA	4.35	SA
5. promotes effective learning aligned with Education 4.0 initiatives through having a safe and protective learning environment where learners' rights are given primary importance.	4.65	SA	4.45	SA
6. provides an environment for free and open expression of ideas that encourage diversity, equity, and inclusion.	4.67	SA	4.51	SA
7. encourages equal participation of all learners through using some forms of making sense of and being responsive to varying learning styles.	4.87	SA	4.54	SA
8. leads in tune with learners and community needs aligned with Education 4.0 initiatives	4.83	SA	4.46	SA
9. provides instruction, which is dynamic, involving, learner-centered, and challenging.	4.83	SA	4.50	SA
10. believes that learners are a crucial part of a classroom community.	4.81	SA	4.54	SA
Overall Mean	4.74	SA	4.48	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – – Very Frequently Occurs

3.41 – 4.20 Agree (A) – Frequently Occurs   1.81 – 2.60 Disagree (D) – Sometimes Occurs

2.61 – 3.40 Moderately Agree (MA) – Often Occurs   1.00 – 1.80 Strongly Disagree (SD) – Rarely Occurs

From Table 27, it can be inferred that among the 10 assessment items, item no. 7, which emphasizes equal participation of all learners by addressing varying learning styles, received the highest computed mean of 4.87, indicating a strong agreement among respondents and suggesting a very frequent occurrence of this practice. Conversely, the item with the lowest weighted mean, at 4.62, pertains to the school's provision of a shared vision and mission aligned with Education 4.0 initiatives. While still highly rated, this suggests a slightly lower frequency compared to other assessed practices.

On the other hand, the public-school teacher- respondents, though with all items under "Strongly Agree" verbal description, too, fall short compared to the school heads' assessment with a moderately low overall mean of 4.48 against the school heads' overall mean of 4.78.

These results suggest that while there is a strong emphasis on encouraging equal participation among learners, indicated by the highest mean score, there's a need for improvement in aligning institutional goals with Education 4.0 initiatives, as indicated by the lower mean score for providing a shared vision and mission.

Additionally, the discrepancy in overall mean scores between school heads and public-school teachers may indicate differences in perceptions or priorities regarding Education 4.0 implementation. School heads may have a broader perspective and deeper involvement in policy implementation, leading to higher ratings on assessment items related to institutional vision and mission alignment with Education 4.0 initiatives. On the other hand, public-school teachers may focus more on day-to-day classroom activities and may not have as much influence over broader institutional goals, potentially leading to slightly lower ratings on those items. Additionally, differences in roles, responsibilities, and perceptions between school heads and teachers could contribute to variations in their assessment scores.

These insights align with Huang et al.'s (2023) study on the seasonality of school climate, which emphasizes the importance of interpersonal interactions within the school community for enhancing children's development and school improvement efforts.

Similarly, Khan et al. (2021) highlight differences in perspectives between school heads and teachers regarding school climate, indicating a need to explore how managerial

practices influence teacher morale.

Furthermore, Belton & Brinkmann's (2024) emphasizes the critical role of school climate, encompassing elements such as relationships, safety, teaching and learning, and institutional environment, in student achievement and overall school success. Addressing gaps in school climate with a child-focused approach is crucial for realizing Education 4.0 initiatives and fostering student growth and development.

During the interview, both school heads and teachers emphasized the importance of inspiring, encouraging, and engaging in educational innovations to effectively facilitate learning within Education 4.0. They believe that focusing on children's education and well-being through such initiatives could contribute to the development of a dynamic school climate.

The Classroom Climate

Classroom climate is a child-friendly environment that is created for students by the school, teachers, and peers. Teachers are continually looking to create a positive classroom climate in which student learning is maximized. In this study, there are ten-point-item statements that are used to assess the school heads' and public-school teachers' perspectives on classroom climate.

Table 28 presents the assessments of the school heads and teachers about classroom climate. The assessment tool consists of a ten-point-item-statement focusing on the different aspects of having positive classroom climate.

Table 28

Respondents' Assessments on Classroom Climate

Item Statement *The classroom…*	School Head Mean	VD	Teacher Mean	VD
1. provides a learning environment where teacher guides learners to learn to work cooperatively as a team.	4.83	SA	4.61	SA
2. manifests classroom atmosphere where the teacher and learners value effort and contribution of others.	4.83	SA	4.62	SA
3. encourages learners to feel welcome and comfortable talking to their teacher.	4.83	SA	4.67	SA
4. provides curriculum that is meaningful, relevant and promotes the social, personal, and intellectual growth of learners.	4.77	SA	4.61	SA
5. accommodates learners wherein the teacher goes out of his/her way to help students.	4.81	SA	4.63	SA
6. promotes student' sense of belonging and sense of competence.	4.77	SA	4.65	SA
7. provides teacher a chance to use some form of making sense of, and being responsive to, varying learning styles	4.73	SA	4.61	SA
8. provides instruction that is dynamic, involving, learner-centered and challenging.	4.75	SA	4.62	SA
9. gives systematic opportunities wherein learners are given chance to reflect on their learning progress.	3.58	A	4.60	SA
10. makes learners as the primary users of assessment information, and assessment and informs students about the learning process, never to punish or shame.	4.75	SA	4.60	SA
Overall Mean	4.67	SA	4.62	SA

Legend:

4.21 – 5.00 Strongly Agree (SA) – – Very Frequently Occurs

3.41 – 4.20 Agree (A) – Frequently Occurs   1.81 – 2.60 Disagree (D) – Sometimes Occurs

2.61 – 3.40 Moderately Agree (MA) – Often Occurs   1.00 – 1.80 Strongly Disagree (SD) – Rarely Occurs

The assessment of school heads regarding classroom climate indicates that items 1 to 3 received the highest computed weighted mean of 4.83, indicating strong agreement. These items focus on creating a cooperative learning environment, valuing effort and contribution, and fostering open communication between teachers and learners.

Conversely, item statement no. 9 received the lowest computed weighted mean of 3.58, suggesting agreement rather than strong agreement. Overall, the school heads' assessment yielded a weighted mean of 4.67, translating to "Strongly Agree".

Meanwhile, teachers' assessment of classroom climate showed that item statement No. 3 received the highest computed weighted mean of 4.67, indicating a positive perception of fostering a welcoming atmosphere for learners. However, item statements Nos. 9 and 10 received the lowest computed weighted mean of 4.60, suggesting slightly lower agreement. Despite this, the overall mean for teachers' assessment was 4.62, also translated into "Strongly Agree."

These results imply that while there is overall agreement on positive aspects of classroom climate, such as cooperative learning and open communication, there are areas that may benefit from further attention, particularly in providing systematic opportunities for learners' reflection and ensuring learner-centered assessment practices. This suggests a potential need for professional development or instructional adjustments to strengthen these aspects of the classroom environment and support more effective teaching and learning outcomes.

Accordingly, Ramos and Israel (2022) conducted a study which express that there is relationship between teacher communication behavior and classroom climate. The result of their research shows that the overall values reveal a positive and significant relationship between teacher communication behavior and the students' science-related attitudes.

In the same manner, one of domains of the Philippine Professional Standards for Teachers (PPST) affirms that one of the basic duties of both school heads and teachers is to ensure that effective learning is taking place at the school level through having administrators (school principals) and teachers who are good stewards and facilitators of learning, respectively (DepEd Order No. 42, s. 2017).

During the interview, teachers were asked to describe their perceptions and insights on this question: *"How relevant is Education 4.0 to your task as an effective facilitator of learning?" Does it affect your establishment of a positive classroom climate? In what ways?"* One commented: *"As an effective facilitator of learning, it is important for teachers to know how we transfer knowledge to our learners; with Education 4.0, learners*

will definitely be equipped with cognitive, social, emotional as well as technical skills needed for learning in the 21st century that will truly contribute to maintain positive classroom climate." Another one added: *"It is highly relevant because Education 4.0 prepares students for the challenges and opportunities of the future. It also allows me to have my own personalized learning experiences and enables access to a wide range of educational resources, making learning more engaging and accessible for my students that ultimately contribute to the attainment of a good classroom climate for my learners."*

The Difference between the School Heads' and Teachers' Assessments on School and Classroom Climate

Table 29 exhibits the results of the t-test analyses which were done to determine if significant difference existed between the School Heads' and teachers' assessments on school climate and classroom climate when compared against each other in a 10-item-assessment tool.

Table 29

Results of the t-test Analysis on the Difference between the Assessments of the School Heads and Teachers

Item	Mean		Mean Diff.	t-value	p-value
	School Heads	Teachers			
School Climate	4.74	4.48	0.26	7.556**	0.000
Classroom Climate	4.67	4.62	0.05	0.354ns	0.727

Legend: ns = not significant (p>0.05)   ** = highly significant (p≤0.01)

It can be noted from the table that the school heads obtained higher weighted mean when assessing the 10-item-assessment tool on school climate with a rating of 4.74 indicating that there exists a mean difference of 0.26 wherein school heads got 4.74 weighted mean compared to 4.48 weighted mean of teachers' assessment on school climate.

As such, the mean difference of 0.26 indicated that the t-value of 7.556** shows a

highly significant p. value of 0.000. Hence, it shows that the null hypothesis of *There is no significant difference between the assessments of the school heads and teachers with regard to school climate* can be confidently rejected, for the results show that there is a highly significant difference between the assessments of school heads and teachers with regard to school climate.

These findings suggest a discrepancy in perceptions of school climate between school heads and teachers, with school heads generally rating the climate more positively compared to teachers. This could indicate differences in perspectives or experiences regarding various aspects of the school environment, highlighting the importance of fostering better communication and collaboration between school leadership and teaching staff to address any potential concerns and promote a more cohesive and supportive school climate.

Implementing constant opportunities for dialogue and an open-door policy, as suggested by Cruz (2022) in her study on school principals' change facilitator styles and leadership competencies, could foster better communication between school heads and teachers. This approach would encourage teachers to voice their suggestions and concerns, enabling school leaders to gain insights into the real situation within their respective schools and work collaboratively to address any issues and improve the overall school climate.

These insights are in conformity with the study of Cansor, et al (2021) which states that the significance of the work climate within school premises, which encompasses shared practices and procedures between school heads and teachers. Understanding various work climates, including leadership and creativity, can help bridge the gap between the real and ideal school climate, fostering a more conducive and supportive environment for all stakeholders.

When asked about how her School Head performs tasks contributing to the implementation of Education 4.0 in order to improve their school climate, one teacher-participant affirmed this: *"My School Head provides training. She organizes workshops, seminars, or training sessions ensuring that teachers and staff are equipped with the necessary knowledge and skills that really contribute to our understanding, and thereby,*

also adds up to having good school climate."

On the other hand, Table 29 also shows that there is no significant difference between school heads' and teachers' assessments on the ten-item-assessment test on classroom climate which is reflected by the indicated p-value of 0.727 which is greater than α= 0.01. This shows that the teachers are affirmative on the ratings that the school heads gave on the aforementioned assessments.

Cognizant to this finding is the study conducted by Dilekci & Limon (2021), which states that in the early years of instructional leadership literature, classroom climate was conceptualized as defining school mission, managing curriculum, and creating a positive learning climate, roles which are all associated to the School Heads' instructional leadership that ultimately leads to an improved learning environment that encourages teachers to teach better (Hallinger, et al, 2020) as cited by Dilekci & Limon (2021).

These findings are affirmed by this direct quote from one of the teacher-participants during the interview conducted wherein she said: *"As a classroom teacher in the new era of education and as a 21st - century teacher, it is important for me to engage positively with my School Head so that we can meet eye-to-eye and implement Education 4.0 for the empowerment of active and impactful learning through digital technology, and thus, contribute to the attainment of a positive classroom climate."*

The Difference between the School Heads' and Teachers' Initiatives on Education 4.0 When They Are Classified According to Their Profile

In this part of the study, Table 30 presents the results of the t-test analyses done to find out if there is a significant difference that exists between the School Heads' and teachers' initiatives on Education 4.0 when they are classified according to their profile.

Table 30

Results of the F/t-test Analysis on the School Heads' and Teachers' Initiatives on Education 4.0 when they are Classified According to their Profile

Item	Profile					
school heads' initiatives	age	sex	CS	HEA	position	service
leading strategically	2.963* (0.041)	2.333ns (0.133)	1.611ns (0.210)	1.191ns (0.327)	1.305ns (0.278)	0.477ns (0.916)
digital infrastructure requirements	0.399ns (0.754)	1.176ns (0.283)	0.395ns (0.676)	1.998ns (0.110)	0.296ns (0.912)	0.609ns (0.821)
personal and professional development	2.069ns (0.117)	1.558ns (0.218)	0.989ns (0.379)	1.996ns (0.110)	2.707* (0.032)	0.873ns (0.580)
building connections	4.283** (0.009)	0.017ns (0.898)	1.248ns (0.296)	1.165ns (0.339)	0.428ns (0.827)	0.404ns (0.953)
ICT skills acquisition /enhancement	1.574ns (0.208)	0.698ns (0.407)	1.219ns (0.304)	1.917ns (0.123)	1.911ns (0.111)	0.953ns (0.507)
teachers' initiatives						
content knowledge and pedagogy	2.025ns (0.090)	0.921ns (0.338)	0.209ns (0.812)	**3.274*** **(0.012)**	2.033ns (0.089)	1.082ns (0.365)
teaching and learning practices/readiness	0.903ns (0.462)	0.838ns (0.360)	0.087ns (0.917)	1.631ns (0.166)	0.562ns (0.690)	1.470ns (0.211)
personal growth and professional development	0.316ns (0.867)	2.954ns (0.086)	0.085ns (0.918)	1.941ns (0.103)	2.354ns (0.053)	1.875ns (0.114)
community linkages and professional engagement	0.306ns (0.874)	**3.979*** **(0.047)**	0.190ns (0.827)	1.350ns (0.251)	1.695ns (0.150)	0.674ns (0.610)
assessment and reporting	0.280ns (0.891)	0.915ns (0.339)	0.158ns (0.854)	2.293ns (0.059)	0.570ns (0.684)	1.300ns (0.269)

Legend: ns = not significant (p>0.05)

Numbers in the upper entry are t/F-values

Numbers in the lower entry (enclosed in parentheses) are probability values

Table 30 reveals that among the five dimensions or indicators of initiatives on Education 4.0, the area with the highest mean of 4.283 is Building Connections followed by Leading Strategically with 2.963 mean score. Next to it is the Personal and Professional Development domain with 2.707. These findings show significant difference with Building Connection indicating the highest significant difference.

These results imply that as the School Heads aged or matured (55 years old and above), their initiatives on Education 4.0 also increase. The same goes with *Leading*

Strategically wherein School Heads under the age bracket of 55 years old and above have more initiatives on Education 4.0.

On the other hand, those School Heads with Head Teacher and Principal 3 positions are greater in number compared to other positions among the participants. It is interesting to note that these School heads have more initiatives under the *Personal and Professional Development* which only attest to the fact that those School Heads with Head Teacher positions are the ones who have a need to improve themselves better, hence, to be promoted in the future, while School Heads with Principal III positions deemed to have better knowledge management, thus, their ability to implement initiatives on Education 4.0 is higher compared to the other positions.

However, all the other demographic profiles such as *Sex, Civil status, Highest Educational Attainment* (HEA), and *Years in the Service* have no bearing on the School Heads' initiatives on Education 4.0.

These findings imply that the initiatives on Education 4.0 do not depend on school heads' profiles except for their age and positions.

These results are consistent with the findings of the study conducted by Bedi, et al (2020), wherein they cited the study of Darmody & Smith (2016) that states that School Heads perform complex tasks in their quest to improve the quality of teaching and learning. The complexity of their duties as they perform their tasks are several factors that influenced the satisfaction level among School Heads, these include personal variables like age and experience.

When it comes to the results of the F/t-test Analysis on Teachers' Initiatives on Education 4.0 when they are classified according to their profile, Table 30 reveals that only two factors affect the teachers' initiatives on Education 4.0. The mean of 3.979* manifests that male teachers have more and better chances of having initiatives on Education 4.0 under the domain of *Community Linkages* and *Professional Engagement* while teachers who have masteral degree with a mean of 3.274 signify that they have better access to *Content Knowledge and Pedagogy* domain, and as such, provide more initiatives on Education 4.0.

Moreover, all the other factors and demographic profile of teachers have no significant impact on their initiatives on Education 4.0 when they are classified according to their profile.

On the other hand, the results imply that that teachers with higher levels of education, particularly those with master's degrees, are more likely to initiate initiatives related to Education 4.0. This implies a significant relationship between teachers' readiness to engage in Education 4.0 initiatives and their educational attainment, as discussed by Edison Estigoy (2021) in his study on Information and Communication Technology (ICT) Readiness and its Integration to Teaching and Learning Process.

The Relationship between School Heads' and Teachers' Initiatives on Education 4.0 and School and Classroom Climate

Table 31 depicts the results of the correlation analyses which were performed to determine if significant relationship exist between School Heads' initiatives on Education 4.0 and school and classroom climate.

Table 31

Results of the Correlation Analysis on the Relationship between School Heads' Initiatives on Education 4.0 and School and Classroom Climate

School Heads' Initiatives on Education 4.0	School Climate		Classroom Climate	
	r-value	p-value	r-value	p-value
Leading Strategically	0.621**	0.000	0.427**	0.002
Digital Infrastructure Requirements	0.544**	0.000	0.307*	0.027
Personal And Professional Development	0.550**	0.000	0.369**	0.007
Building Connections	0.716**	0.000	0.433**	0.001
ICT Skills Acquisition /Enhancement	0.618**	0.000	0.387**	0.005

Legend: ** = highly significant ($p \leq 0.01$)   * = significant ($p \leq 0.05$)

It can be examined from the table that highly significant relationship was found between the School Heads' initiatives on Education 4.0 in terms of Building Connections, Leading Strategically, ICT Skills Acquisition/Enhancement, Personal and Professional Development and Digital Infrastructure Requirements and School Climate with the domain

of *Building Connections* having the highest r-value of 0.716 with a p-value of 0.000. This highly significant relationship is manifested by the computed probability values that all have 0.000 which are smaller than the 0.01 significance level. Further examination of the table reveals that direct relationship exists between the aforementioned variables as indicated by the positive sign of the correlation values that ranged from 0.544 to 0.716.

These results indicate that when the School heads' initiatives on Education 4.0 increases, the manifestation of positive school climate also increases.

In addition, Table 31 also shows that a highly significant relationship exists between the School Heads' initiatives on Education 4.0 and Classroom Climate wherein all indicators fall under highly significant category except the domain of *Digital Infrastructure Requirements* which only shows significant relationship garnering a r-value of 0.307 with a p-value of 0.027.

Furthermore, it can be deduced from the table that the domain of *Building Connections* obtained the highest r- values of 0.716 and 0.433, respectively both indicating highly significant relationship between School Heads' initiatives on Education 4.0 and school and classroom climate.

These results show that when the level of the School Heads' initiatives on Education 4.0 increases, the attainment of positive school climate and classroom climate also increases.

The results of the present study corroborate with the findings of Capinding (2023) wherein he states that one of the elements that may have an impact on classroom climate is the environment in which students learn, including the role of the faculty, their teaching methods, the academic standards, and the accessibility of learning resources, including *Digital Infrastructure Requirements* that really determine whether both the teachers and learners are ready to understand and implement the crucial part digital citizenship plays in continuously pursuing Education 4.0 initiatives.

These findings collaborate the results of the study conducted by Ongel and Tabancali (2022) that examined the effect of School Heads' organizational values and practices that facilitate and encourage information exchange between teachers that in turn, increases teacher enthusiasm. They add that in this respect, investigating organizational

processes that facilitate cooperation and positively affect the achievement of school goals may be beneficial in terms of increasing the effectiveness of schools.

In the conducted interview with School Head-respondents, they were asked about the crucial role of Education 4.0 in their mandate as School Leaders and in what aspects do they need to improve themselves to improve their school and classroom climate, one of the principal-respondents explained, *"Education 4.0 plays a crucial role in the following aspects of my life as A School Head: (1) Transformational leadership: School Leaders need to empower themselves and their teachers with various leadership skills to effectively implement the Education 4.0 initiatives; () .Digital Leadership: we are expected to be digital leaders who possess up to date technological and digital pedagogical knowledge; (3) Sustainable Leadership: we are tasked with leading sustainable schools, creating a school climate that supports learning and innovation; (4) Competency Development: we need to identify and develop key competencies that facilitate and maximize effectiveness in implementing Education 4.0 ; and (5) Change Management: we play a crucial role in managing change that adds up to continuously establishing positive school and classroom climate for our teachers and learners"*.

Table 32

Results of the Correlation Analysis on the Relationship between Teachers' Initiatives on Education 4.0 and School and Classroom Climate

Teachers' Initiatives on Education 4.0	School Climate		Classroom Climate	
	r-value	p-value	r-value	p-value
content knowledge and pedagogy	0.563**	0.000	0.490**	0.000
teaching and learning practices/readiness	0.550**	0.000	0.482**	0.000
personal growth and professional development	0.654**	0.000	0.628**	0.000
community linkages and professional engagement	0.656**	0.000	0.593**	0.000
assessment and reporting	0.658**	0.000	0.557**	0.000

Legend: ** = highly significant (p≤0.01)

Table 32 summarizes the results of the correlation analyses which were performed to determine if significant relationship exists between the teachers' initiatives on Education 4.0 and school and classroom climate.

It can be observed from the table that highly significant relationship was found between the teachers' initiatives on Education 4.0 and school and classroom climate. This highly significant relationship is indicated by the computed probability values for these variables that are all have p-values of 0.000 which are lower than 0.01 significance level. Further observation of the table shows that direct relationship exists between the aforementioned variables as implied by the positive sign of the correlation values that ranged from 0.550 to 0.658 in school climate and ranging from 0.482 to 0.628 in classroom climate.

These results show that as the level of teachers' initiatives on Education 4.0 increases, the level of the teachers' attaining the indicators on school and classroom climate also increases.

Hence, these results imply that providing a positive and supportive work environment and climate for faculty and staff, more often than not, improves faculty, staff and student performance as revealed in a study conducted by Costa, et al (2021).

Furthermore, it can be seen from the table that the domain *Community Linkage and Professional Engagemen*t" "obtained the second highest r-value of 0.656 signifying highly significant relationship while "Assessment and Reporting" got the highest r-value of 0.658 indicating that as this set of initiatives increases, the teachers' manifestation of school and classroom climate indicators also increases.

In the same way, when it comes to the correlation between teachers' initiatives on Education 4-0 and classroom climate, it was discovered that the domain "Personal Growth and Professional Development" obtained the highest r-value of 0.628 indicating highly significant relationship while the domain "Teaching & Learning Practices/Readiness" received the lowest r-value of 0.482, though, all of the domains have verbal description of "Strongly Agree."

Accordingly, Dichoso (2024) states that there are varied strategies that the school administrators and teachers utilize to be able to achieve a positive school climate. They also emphasize that there are challenges encountered by the school in its desire to promote a positive school climate and one way to ensure the continuous establishment of positive school and classroom climate is to guarantee that the school heads as school leaders could

provide the necessary assistance to teachers when it comes to teaching and learning practices, particularly in the implementation of Education 4.0.

During the conducted interview, when asked "How do your initiatives on Education 4.0 relevant to your task in providing an effective learning environment and positive classroom climate to your learners"? One of the teacher-respondents said: *"My initiatives on Education 4.0 are highly relevant to my task as an effective facilitator of learning and as a provider of an effective learning environment and positive school and classroom climate to my pupils, because through it, I will be able to adapt teaching methods, integrate technology, and personalize learning experiences to meet the needs of my students in the digital age, which in turn could contribute to the attainment of a positive and dynamic school climate".*

Proposed Strategic Plan based on the Results of the Study

As the findings of the study manifested, all variables received the highest value of verbal description of "Strongly Agree" equivalent to "Very Frequently Occurs" based on the assessments of both teachers and school heads. The researcher chose variables that yielded the lowest overall mean and considered these for the strategic plan.

It is on these premises that the researcher offers the proposed strategic plan crafted based on the results of the study, which is presented in Table 33.

Table 33

Blueprint crafted for Strategic Foresight based on the Results of the Study

I.   Mission Statement Our mission is to foster a progressive and supportive educational environment that embraces the principles of Education 4.0, empowering school heads and teachers to lead strategically and effectively in the digital age. We are committed to enhancing personal and professional development, building strong community linkages, and continuously improving school and classroom climates.
II. Vision Statement Our vision is to transform Educational District II (EDDIS II) of Bulacan into a beacon of innovative education where every school head and teacher excels as initiators of Education 4.0, thereby cultivating an outstanding school climate that nurtures student success and holistic development.

III. SWOT Analysis
- Strengths:
  - The majority of school heads and teachers possess advanced degrees (master and doctorates).
  - School heads hold higher leadership positions (e.g., Head Teacher III).
  - Strong agreement between school heads and teachers in their roles as initiators of Education 4.0.
- **Weaknesses:**
  - Significant differences in assessments of school climate between school heads and teachers.
  - Middle-aged and predominantly female workforce, which may present challenges in adapting to rapidly changing technologies.
- **Opportunities:**
  - Year-round strategic planning on resource and facility management.
  - Programs and activities to boost initiatives from the results of the study.
  - Potential for further research to refine and enhance strategies.
- **Threats:**
  - Disparities in perceptions of school and classroom climate could hinder unified progress.
  - Rapid technological advancements requiring continuous adaptation and training.

IV. Competitive Analysis
- *Internal Competitors:*
  - Schools within EDDIS II that may already be advanced in implementing Education 4.0.
  - Individual educators who independently pursue advanced professional development.
- *External Competitors:*
  - Private schools with potentially more resources and flexibility to adopt Education 4.0 initiatives.
  - International educational programs and online platforms offering cutting-edge teaching methodologies.

V. Objectives
1. Improve alignment between school heads' and teachers' assessments of school climate.
2. Enhance the effectiveness of school heads and teachers as initiators of Education 4.0.
3. Foster continuous personal and professional development among educators regarding Education 4.0.
4. Strengthen community linkages and professional engagement about Education 4.0.
5. Implement strategic resource and facility management to support Education 4.0 initiatives.

VI. Strategies

1. Alignment Initiatives: Conduct regular workshops and feedback sessions to bridge the gap between school heads' and teachers' perceptions on school climate.
2. Professional Development: Offer targeted training programs focusing on digital infrastructure, ICT skills, and innovative pedagogies.
3. Community Engagement: Develop partnerships with local organizations and stakeholders to support educational initiatives and community linkages on E4.
4. Resource Management: Organize year-round strategic planning sessions to optimize resource allocation and facility management on Education 4.0 (E4).
5. Research and Feedback: Encourage continuous research and feedback mechanisms to adapt and refine strategies based on evolving needs regarding Education 4.0.

VII. Tactics/Techniques

1. Workshops and Feedback Sessions:
   - Schedule bi-monthly workshops for school heads and teachers.
   - Implement a structured feedback mechanism to gather and address concerns.
2. Targeted Training Programs:
   - Design and offer professional development courses in collaboration with educational technology experts.
   - Provide incentives for teachers and school heads to participate in these programs.
3. Community Partnerships:
   - Identify and approach local businesses and organizations for potential collaborations on Education 4.0.
   - Organize community events to showcase educational initiatives and foster engagement on Education 4.0.
4. Strategic Resource Planning:
   - Develop a comprehensive resource and facility management plan on E4.
   - Conduct quarterly reviews to assess and adjust the plan based on current needs and feedback.
5. Continuous Research and Adaptation:
   - Establish a research committee to oversee ongoing studies and collect data.
   - Publish findings and recommendations to inform future strategic planning and implementation efforts on Education 4.0.

VIII. Monitoring and Evaluation

The Monitoring and Evaluation (M&E) system shall serve as an integrating mechanism across governance levels and within operating units of the Department of Education (DepEd). As such, this Strategic Plan is also provided with M&E system in order to provide the researcher as the primary decision-maker with evidence-based information on the applicability and feasibility of formulation and implementation of policies, programs, projects, and major activities included on this Strategic Plan.

Purpose: It allows the researcher to make adjustments in the quality of this strategic basic education plan including technical, human resource, and administrative services.

Overall Lead: Researcher, School Head, Master Teacher/s

Process Owner: Researcher
Responsible Office: All personnel and stakeholders in the school

CHAPTER IV

FINDINGS, CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary of the major findings, the conclusions arrived at based on the findings, and the recommendations given in accordance with the conclusions.

Findings

This study analyzed the initiatives implemented by school heads and teachers in response to Education 4.0 and assessed their direct impact on the overall school and classroom climate.in Educational District II (EDDIS II) of Bulacan during the School Year 2023–2024.

Using the procedures described in the preceding chapter, the answers to the problems raised in this study were ascertained and summarized as follows: Findings revealed that the majority of the school head and teacher respondents are in the middle-aged category, female dominated, mostly are married, majority earned master's and doctorate degree and more senior in so far as length of service is concerned. Additionally, most school heads hold the Head Teacher III position, while teachers hold higher positions than Teacher I.

Meanwhile, public elementary school heads themselves strongly agreed that they are "initiators" of Education 4.0 in terms of leading strategically, digital infrastructure requirements, personal and professional development, building connections and ICT skills acquisition /enhancement.

On the other hand, public elementary teachers themselves strongly agreed that they are "initiators" of Education 4.0 in terms of content knowledge and pedagogy, teaching and learning practices/readiness, personal growth and professional development, community linkages and professional engagement and assessment and reporting.

Highly Significant difference was found also between the assessments of school heads and teachers with regard to school climate. However, there is no significant

difference was found between the assessments of school heads and teachers with regard to classroom climate.

Similarly, significant relationships were found between the school heads' initiatives on leading strategically and building connections with their age. On the other hand, significant relationships were found between the teachers' initiatives on content knowledge and pedagogy and highest educational attainment and initiatives community linkages and professional engagement with sex.

Likewise, highly significant relationships were found between the school heads' initiatives on Education 4.0 and school climate. Moreover, highly significant relationship was found between the teachers' initiatives on Education 4.0 and school and classroom climate.

Conclusions

Based on the findings of the study, the following conclusions were drawn: There is a significant difference between the assessments of the school heads and teachers with regard to school climate. There is a significant difference between the school heads' and teachers' initiatives on Education 4.0 when they are classified according to their profile. There is a significant relationship between school heads' and teachers' initiatives on Education 4.0 and school and classroom climate.

Recommendations

In light of the findings and conclusions of the study, the following recommendations are hereby offered:

1. The school and teachers may enhance their initiatives through year-round strategic planning focused on optimizing resource and facility management through the following activities:
   A. For Teachers:
      a. Teachers are encourage to embrace continuous professional development through workshops, seminars, and training sessions

focused on enhancing content knowledge, pedagogy, and ICT integration.

b. They may create a collaborative environment by sharing best practices and techniques for implementing Education 4.0 efficiently. Moreover, by developing a collaborative culture within the school, teachers can create a supportive environment that encourages creativity and progress.

B. For School Heads:

a. School heads are encouraged to support teachers' professional growth as initiators of Education 4.0 by allocating resources for training and mentorship programs, as well as creating opportunities for teachers to improve their skills in strategic leadership, digital infrastructure management, and ICT integration.

b. They may promote a positive school climate through effective communication, collaboration, and support systems that promote a sense of belonging, trust, and mutual respect among all stakeholders.

2. Adoption of the blueprint for strategic foresight is highly encouraged.

3. For future researchers, further research along this line using other parameters may be conducted. The same study may be conducted using pure qualitative research to see the relevant problems of the school heads and teachers' initiatives on Education 4.0.

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APPENDICES

Appendix A

Letter Request for the Schools Division Superintendent of Bulacan

Republic of the Philippines
BULACAN AGRICULTURAL STATE COLLEGE
College of Education
Pinaod, San Ildefonso, Bulacan, Philippines 3010

13 February 2024

NORMA P. ESTEBAN, EdD, CESO V
Schools Division Superintendent
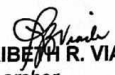Division of Bulacan
Malolos City

Madam:

The undersigned is presently working on her dissertation entitled *"School Heads' and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight"* as a final requirement for the graduate degree of Doctor of Philosophy major in Educational Management.

In this regard, she is requesting permission from your good office to allow her to conduct and administer questionnaires to the teachers and school heads of the City of Baliwag and the Municipalities of Bustos and Plaridel, Bulacan. Rest assured that the facts and information gathered will be treated with confidentiality and shall be used solely for this study.

Thank you for your kind consideration to this request.

Very truly yours,
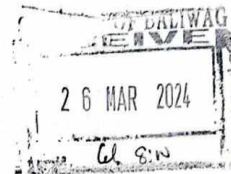
MARIBETH R. VIADOR
Researcher

Noted:

MA. CHARITO ROBLES-CRUZ, PhD
Adviser

MARIA KRISVIE ABIGALE F. MENDOZA
Dean, Institute of Education

www.basc.edu.ph / Email: basc_52@yahoo.com
Telefax Nos: (044) 762-1427 / (044) 762-0120

Letter Request for the Schools Division Superintendent of City of Baliwag

Republic of the Philippines
BULACAN AGRICULTURAL STATE COLLEGE
College of Education
Pinaod, San Ildefonso, Bulacan, Philippines 3010

27 February 2024

ROWENA T. QUIAMBAO, CESO VI
OIC Schools Division Superintendent
Schools Division of City of Baliwag
Baliwag City

Madam:

The undersigned is presently working on her dissertation entitled *"School Heads' and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight"* as a final requirement for the graduate degree of Doctor of Philosophy major in Educational Management.

In this regard, she is requesting permission from your good office to allow her to conduct and administer questionnaires to the teachers and school heads of the City of Baliwag and the Municipalities of Bustos and Plaridel, Bulacan. Rest assured that the facts and information gathered will be treated with confidentiality and shall be used solely for this study.

Thank you for your kind consideration to this request.

Very truly yours,

MARIBETH R. VIADOR
Researcher

Noted:

MA. CHARITO ROBLES-CRUZ, PhD
Adviser

MARIA KRISVIE ABIGALE F. MENDOZA
Dean, Institute of Education

www.basc.edu.ph / Email: basc_52@yahoo.com
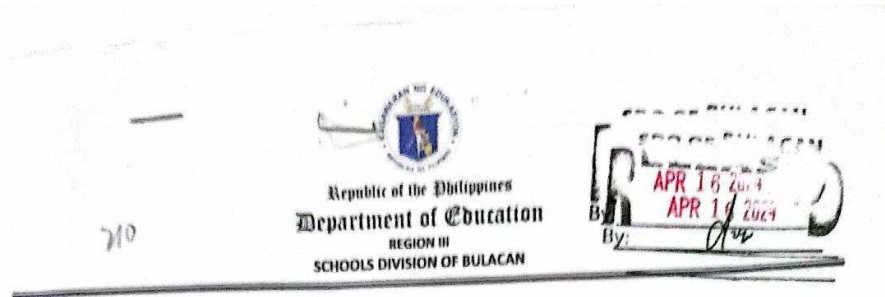Telefax Nos: (044) 762-1427 / (044) 762-0120

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Appendix B

Endorsement from Schools Division of Bulacan

Republic of the Philippines
Department of Education
REGION III
SCHOOLS DIVISION OF BULACAN

APR 16 2024
APR 17 2024

1ˢᵗ Endorsement
April 2, 2024

Respectfully returned to **Ms. Maribeth R. Viador,** Researcher, Bulacan Agricultural State College, San Ildefonso, Bulacan, the herein approved request to conduct a study involving school heads and teachers from public schools in Bustos District and Plaridel District, this Division, in connection with the dissertation titled "School Heads' and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight," subject to the following conditions:

- participation in the study shall be strictly voluntary;
- government resources shall not be used;
- regular instructional programs shall not be affected;
- ethical research procedures shall be adhered to; and
- standard health safety protocols should be observed.

For guidance and compliance.

NORMA F. ESTEBAN, EdD, CESO V
Schools Division Superintendent

emailed 10:51am - 4/8/24

DepED
MATATAG
BAGONG PILIPINAS

Address: Provincial Capitol Compound, Brgy. Guinhawa,
City of Malolos, Bulacan
Website: https://bulacandeped.com
Email: bulacan@deped.gov.ph

Endorsement from Schools Division of City of Baliwag

Republic of the Philippines

Department of Education
REGION III-CENTRAL LUZON
SCHOOLS DIVISION OF CITY OF BALIWAG

1st Endorsement
March 26, 2024

Respectfully returned to the Dean of Institute of Education in Bulacan Agricultural State College, San Ildefonso, Bulacan the herein request for the collection of data needed for the research titled *"School Heads and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight"* of Ms. Maribeth R. Viador, APPROVED to be conducted to school heads in this Schools Division Office.

ROWENA D. QUIAMBAO, CESO VI
Assistant Schools Division Superintendent
Officer-in Charge
Office of the Schools Division Superintendent

Planning & Research/SGOD
3/26/2024

Address: Baliwag North District Compound, J.Buizon St. Poblacion, City of Baliwag, Bulacan
Contact Number: (044) 816-6041
Email Address : baliwag.city@deped.gov.ph

Appendix C
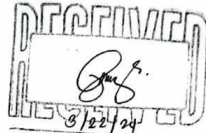
Letter Request for Pilot Testing

Republic of the Philippines
BULACAN AGRICULTURAL STATE COLLEGE
College of Education
Pinaod, San Ildefonso, Bulacan, Philippines 3010

22 March 2024

ANGELITA C. BALTAZAR
Public Schools District Supervisor
Angat District
Schools Division of Bulacan

Madam:

The undersigned is presently working on her dissertation entitled *"School Heads' and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight"* as a final requirement for the graduate degree of Doctor of Philosophy major in Educational Management.

In this regard, she is requesting permission from your good office to allow her to conduct and administer questionnaires to Matias A. Fernando Memorial School teachers and five (5) school heads of your district for pilot testing purposes. The information collected during this pilot testing phase will be instrumental in refining the questionnaire and ensuring its suitability for the subsequent data collection phase of her study.

Rest assured that all responses obtained during the pilot testing will be handled with the utmost confidentiality and used exclusively for this study.

Thank you for your kind consideration to this request.

Very truly yours,

MARIBETH R. VIADOR
Researcher

Noted:

MA. CHARITO ROBLES-CRUZ, PhD
Adviser

Approved:

ANGELITA C. BALTAZAR
Public Schools District Supervisor

www.basc.edu.ph / Email: basc_52@yahoo.com
Telefax Nos: (044) 762-1427 / (044) 762-0120

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Republic of the Philippines
BULACAN AGRICULTURAL STATE COLLEGE
College of Education
Pinaod, San Ildefonso, Bulacan, Philippines 3010

22 March 2024

MARIELYN D. CASTILLO
School Principal III
Matias A. Fernando Memorial School
Angat District
Schools Division of Bulacan

Madam:

The undersigned is presently working on her dissertation entitled *"School Heads' and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight"* as a final requirement for the graduate degree of Doctor of Philosophy major in Educational Management.

In this regard, she is requesting permission from your good office to allow her to conduct and administer questionnaires to Matias A. Fernando Memorial School teachers for pilot testing purposes. The information collected during this pilot testing phase will be instrumental in refining the questionnaire and ensuring its suitability for the subsequent data collection phase of her study.

Rest assured that all responses obtained during the pilot testing will be handled with the utmost confidentiality and used exclusively for this study.

Thank you for your kind consideration to this request.

Very truly yours,

MARIBETH R. VIADOR
Researcher

Noted:

MA. CHARITO ROBLES-CRUZ, PhD
Adviser
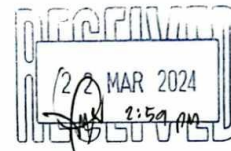
Approved:

MARIELYN D. CASTILLO
School Principal III

www.basc.edu.ph / Email: basc_52@yahoo.com
Telefax Nos: (044) 762-1427 / (044) 762-0120

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Appendix D

Sample Letter of Request for the Public School District

Republic of the Philippines
BULACAN AGRICULTURAL STATE COLLEGE
College of Education
Pinaod, San Ildefonso, Bulacan, Philippines 3010

27 February 2024

JENNIFER E. QUINTO, PhD.
Public Schools District Supervisor
Baliwag North District
OIC CID Chief
Schools Division of City of Baliwag

RECEIVED
0 2 APR 2024

Madam:

The undersigned is presently working on her dissertation entitled *"School Heads' and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight"* as a final requirement for the graduate degree of Doctor of Philosophy major in Educational Management.

In this regard, she is requesting permission from your good office to allow her to conduct and administer questionnaires to the teachers and school heads of the City of Baliwag and the Municipalities of Bustos and Plaridel, Bulacan. Rest assured that the facts and information gathered will be treated with confidentiality and shall be used solely for this study.

Thank you for your kind consideration to this request.

Very truly yours,

MARIBETH R. VIADOR
Researcher

Noted:

MA. CHARITO ROBLES-CRUZ, PhD
Adviser

Approved:

JENNIFER E. QUINTO, PhD.
Public Schools District Supervisor

www.basc.edu.ph / Email: basc_52@yahoo.com
Telefax Nos: (044) 762-1427 / (044) 762-0120

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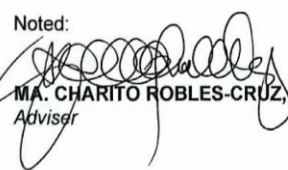BUREAU VERITAS
Certification

Republic of the Philippines
BULACAN AGRICULTURAL STATE COLLEGE
College of Education
Pinaod, San Ildefonso, Bulacan, Philippines 3010

27 February 2024

DULCE REGINA C. FLORES, PhD
Public Schools District Supervisor
Bustos District
Schools Division of Bulacan

Madam:

The undersigned is presently working on her dissertation entitled *"School Heads' and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight"* as a final requirement for the graduate degree of Doctor of Philosophy major in Educational Management.

In this regard, she is requesting permission from your good office to allow her to conduct and administer questionnaires to the teachers and school heads of the City of Baliwag and the Municipalities of Bustos and Plaridel, Bulacan. Rest assured that the facts and information gathered will be treated with confidentiality and shall be used solely for this study.

Thank you for your kind consideration to this request.

Very truly yours,

MARIBETH R. VIADOR
Researcher

Noted:

MA. CHARITO ROBLES-CRUZ, PhD
Adviser

RECEIVED
MAR 2 6 2024

Approved:

DULCE REGINA C. FLORES, PhD
Public Schools District Supervisor

www.basc.edu.ph / Email: basc_52@yahoo.com
Telefax Nos: (044) 762-1427 / (044) 762-0120

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Republic of the Philippines
BULACAN AGRICULTURAL STATE COLLEGE
College of Education
Pinaod, San Ildefonso, Bulacan, Philippines 3010

27 February 2024

RACQUEL D. SALAZAR
Public Schools District Supervisor
Bustos District
Schools Division of Bulacan

Madam:

The undersigned is presently working on her dissertation entitled *"School Heads' and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight"* as a final requirement for the graduate degree of Doctor of Philosophy major in Educational Management.

In this regard, she is requesting permission from your good office to allow her to conduct and administer questionnaires to the teachers and school heads of the City of Baliwag and the Municipalities of Bustos and Plaridel, Bulacan. Rest assured that the facts and information gathered will be treated with confidentiality and shall be used solely for this study.

Thank you for your kind consideration to this request.

Very truly yours,

MARIBETH R. VIADOR
Researcher

Noted:

MA. CHARITO ROBLES-CRUZ, PhD
Adviser

Approved:

RACQUEL D. SALAZAR
Public Schools District Supervisor

www.basc.edu.ph / Email: basc_52@yahoo.com
Telefax Nos: (044) 762-1427 / (044) 762-0120

Republic of the Philippines
BULACAN AGRICULTURAL STATE COLLEGE
College of Education
Pinaod, San Ildefonso, Bulacan, Philippines 3010

27 February 2024

RECEIVED

0 2 APR 2024

IRENE LABAO-ELIZALDE, EdD.
Public Schools District Supervisor
Baliwag South District
OIC SGOD Chief
Schools Division of City of Baliwag

Madam:

The undersigned is presently working on her dissertation entitled *"School Heads' and Teachers' Initiatives on Education 4.0: Basis for Crafting Blueprint for Strategic Foresight"* as a final requirement for the graduate degree of Doctor of Philosophy major in Educational Management.

In this regard, she is requesting permission from your good office to allow her to conduct and administer questionnaires to the teachers and school heads of the City of Baliwag and the Municipalities of Bustos and Plaridel, Bulacan. Rest assured that the facts and information gathered will be treated with confidentiality and shall be used solely for this study.

Thank you for your kind consideration to this request.

Very truly yours,

MARIBETH R. VIADOR
Researcher

Noted:

MA. CHARITO ROBLES-CRUZ, PhD
Adviser

Approved:

IRENE LABAO-ELIZALDE, EdD.
Public Schools District Supervisor

www.basc.edu.ph / Email: basc_52@yahoo.com
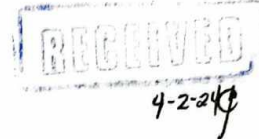Telefax Nos: (044) 762-1427 / (044) 762-0120

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Appendix E

Survey Questionnaire

SCHOOL HEADS' AND TEACHERS' INITIATIVES ON EDUCATION 4.0: BASIS FOR BLUEPRINT FOR A STRATEGIC FORESIGHT

Name of Respondent (optional): _____

Name of School: _____

Part I. Please check the appropriate answer in each item.
A. Age: _____
B. Sex
☐ Male
☐ Female
C. Civil Status
☐ single   ☐ separated
☐ married   ☐ Common-law
☐ widowed
D. Highest Education Attained
☐ Bachelor's degree
☐ Master's degree   ☐ With MA Units
☐ Doctoral degree   ☐ With Doctoral Units
E. Designation
☐ Head Teacher I   ☐ Principal I
☐ Head Teacher II   ☐ Principal II
☐ Head Teacher III   ☐ Principal III
F. Years in Service: _____

Part II: School Heads' Initiatives on Education 4.0
Directions: Please indicate what you *really* think about the items enumerated in the table by putting a √ in the column corresponds to the following scale:

5	**Strongly Agree (SA) – Very High**
4	**Agree (A) – High**
3	**Moderately Agree (MA) - Average**
2	**Disagree (D) – Low**
1	**Strongly Disagree (SD) – Very Low**

Item Statement	5	4	3	2	1
A. Leading Strategically					

The School Head as an initiator of Education 4.0 …					
1. serves as benchmarkee in communicating the DepEd initiatives on Education 4.0					
2. shares with fellow school heads best practices in the development and implementation of school plans aligned with initiatives for Education 4.0, such as digitization of transactions, etc.					
3. promotes a culture of training soft and hard key competencies on Education 4.0					
4. integrates the development of technology to support real-time decision-making through Cyber-Physical Systems (CPS), Internet of Things (IoT), among others					
5. monitors teachers' initiatives on Education 4.0 through technologies and collaborative, flexible, and personalized pedagogical approaches in updating teaching methods toward increasing the effectiveness of teaching-learning					
B. Digital Infrastructure Requirements *The School Head initiates Education 4.0 through enhancing ICT-based development that…*					
1. provides a learning environment that takes charge of the ICT needs of both teachers and learners.					
2. provides strong internet connection which is accessible both for teachers and learners.					
3. offers available teaching spaces with flexible layouts, equipped with technology that enables learners and staff to connect to screens wirelessly for collaboration.					
4. provides digital infrastructure which provides open access to scientific data and knowledge, further commercialization of research, innovation, products, and services.					
5. provides computer laboratory with internet connection in which learners can watch educational videos and collaborate with other learners					
C. Personal and Professional Development *The implementation of Education 4.0 is evident in the school through each initiative wherein the School Head…*					
1. sets personal and professional development goals based on self-assessment aligned with digital citizenship.					
2. implements the performance management system with a team to support the career advancement of school personnel, and to improve digital citizenship performance.					
3. implements professional development initiatives to enhance strengths and address performance gaps with digital citizenship.					
4. provides opportunities to individuals and teams in performing leadership roles and responsibilities towards digital citizenship.					

	5	4	3	2	1
5. possesses a strong understanding of available digital capabilities in enhancing teaching and learning in the digital era.					
D. Building Connections *The School Head builds connections for the attainment of Education 4.0 through each initiative as he/she…*					
1. builds constructive relationships with authorities, colleagues, parents, and other stakeholders to foster an enabling and supportive environment for learners' digital citizenship.					
2. manages school/classroom organizations, such as learner organizations, faculty clubs and parent- teacher associations, by applying relevant policies and guidelines to support the attainment of digital citizenship.					
3. communicates effectively to teachers, learners, parents, and other stakeholders, through positive use of communication platforms, to facilitate digital citizenship.					
4. initiates partnerships with the community, such as parents, alumni, authorities, industries, and other stakeholders, to strengthen support for digital citizenship.					
5. develops digital skills across the organization through professional development programs.					
E. ICT Skills Acquisition /Enhancement *The School Head's acquired and enhanced skills in Education 4.0 are manifested through each initiative wherein he/she…*					
1. enhances the coordination of education resources through the use of ICT devices.					
2. enhances proper keeping of records for efficient management of educational resources through the use of ICT devices.					
3. enhances effective communication in the school system for efficient management of educational resources through the use of ICT devices.					
4. enhances proper accountability of educational resources in the school system through the use of ICT devices.					
5. enhances efficient management of educational resources through proper utilization of ICT devices in sourcing for information useful for the maintenance of educational resources.					

Part III: School Climate
Directions: Please indicate what you *really* think about the items enumerated in the table by putting a √ in the column corresponds to the following scale:

5	**Strongly Agree (SA) – Very Frequently Occurs**
4	**Agree (A) - Frequently Occurs**
3	**Moderately Agree (MA) – Often Occurs**
2	**Disagree (D) – Sometimes Occurs**
1	**Strongly Disagree (SD) – Rarely Occurs**

Item Statement *The school…*	5	4	3	2	1
1. provides a sense of vision, and a mission aligned with Education 4.0 initiatives that are shared by all personnel.					
2. offers quality instruction and offers support services to all types of learners.					
3. engages in "authentic learning" activities wherein the teachers make learners responsible for their own learning through the teachers' efficient and updated ICT-based instruction aligned with Education 4.0 initiatives.					
4. sustains effective supports for learners needing alternative modes of communication (e.g., manual signs, communication boards, computer-based devices, picture exchange systems, Braille).					
5. promotes effective learning aligned with Education 4.0 initiatives through having a safe and protective learning environment where learners' rights are given primary importance.					
6. provides an environment for free and open expression of ideas that encourages diversity, equity, and inclusion.					
7. shows constant support for implementation of Education 4.0 by checking in regularly with the team ensuring that resources are available, and communicating with the school community what is happening.					
8. leads in tune with learners and community needs aligned with Education 4.0 initiatives					
9. develops creative strategies to actively engage the teachers, learners, staff, and families in the importance of implementing evidence-based interventions proven to be effective with school population and context					
10. believes that learners are a crucial part of a classroom community.					

Part IV: Classroom Climate
Directions: Please indicate what you *really* think about the items enumerated in the table by putting a √ in the column corresponds to the following scale:

5	**Strongly Agree (SA) – Very Frequently Occurs**
4	**Agree (A) - Frequently Occurs**
3	**Moderately Agree (MA) – Often Occurs**
2	**Disagree (D) – Sometimes Occurs**
1	**Strongly Disagree (SD) – Rarely Occurs**

Item Statement	5	4	3	2	1
Classroom Climate *The classroom…*					
1. provides a learning environment where teacher guides learners to learn to work cooperatively as a team.					
2. manifests classroom atmosphere where the teacher and learners value effort and contribution of others.					
3. encourages learners to feel welcome and comfortable talking to their teacher.					
4. provides curriculum that is meaningful, relevant and promotes the social, personal, and intellectual growth of learners.					
5. accommodates learners wherein the teacher goes out of his/her way to help learners.					
6. promotes learners' sense of belonging and sense of competence.					
7. enhances opportunities for equal participation of all learners through using some forms of making sense of and being responsive to varying learning styles.					
8. provides instruction that is dynamic, involving, learner-centered and challenging.					
9. gives systematic opportunities wherein learners are given chance to reflect on their learning progress.					
10. makes learners as the primary users of assessment information, and assessment and informs learners about the learning process, never to punish or shame.					

Survey Questionnaire for Teachers

SCHOOL HEADS' AND TEACHERS' INITIATIVES ON EDUCATION 4.0: BASIS FOR CRAFTING BLUEPRINT FOR STRATEGIC FORESIGHT

Name of Respondent (optional):_____

Name of School:_____

Part I. Please check the appropriate answer in each item.

    A. Age: _____

    B. Sex

        ☐ Male

        ☐ Female

    C. Civil Status

        ☐ single   ☐ separated

        ☐ married   ☐ Common-law

☐ widowed
D. Highest Education Attained
   ☐ Bachelor's degree
   ☐ Master's degree   ☐ With MA Units
   ☐ Doctoral degree   ☐ With PhD Units
E. Designation
   ☐ Teacher I   ☐ Master Teacher I
   ☐ Teacher II   ☐ Master Teacher II
   ☐ Teacher III
F. Years in Service: ____

Part II: TEACHERS' INITIATIVES ON EDUCATION 4.0

Directions: Please indicate what you *really* think about the items enumerated in the table by putting a √ in the column corresponds to the following scale:

5   **Strongly Agree (SA) – Very High**
4   **Agree (A) – High**
3   **Moderately Agree (MA) - Average**
2   **Disagree (D) – Low**
1   **Strongly Disagree (SD) – Very Low**

Item Statement	5	4	3	2	1
A. Content Knowledge and Pedagogy *The teacher as an initiator of Education 4.0 ...*					
1. applies knowledge of content on ICT-based instruction					
2. ensures the positive use of ICT to facilitate the teaching and learning process					
3. integrates ICT into the teaching-learning process					
4. engages learners in meaningful exploration, discovery, and hands-on technological advances on Education 4.0 (E4)					
5. conducts more studies that propose solutions to overcome the technological challenges in teaching E4					
B. Teaching and Learning Practices/Readiness *The teacher as an initiator of Education 4.0 ...*					
1. uses strategies in the delivery of instruction like augmented and virtual reality, problem and inquiry-based teaching and learning, and gamification and simulation.					
2. utilizes technology-based assessment tools. (ex. Kahoot, Quizlet)					
3. teaches digital citizenship (technology ethics, social, ethical, and legal responsibilities in the use of technology tools and resources, etc.)					
4. attends seminars and conferences to enhance technological and pedagogical skills.					

	5	4	3	2	1
5. shows skills in learning management system, google classroom, and online class modality.					
C. Personal Growth and Professional Development *The teacher initiates Education 4.0 as s/he…*					
1. sets professional development goals aligned with Education 4.0.					
2. participates in collegial discussions that use teaching and learner feedback to enrich teaching practices manifesting E4.					
3. organizes and uses appropriate teaching and learning resources including ICT.					
4. addresses learning goals that support Education 4.0					
5. uses E4 approaches in reflecting one's career growth.					
D. Community Linkages and Professional Engagement *The teacher initiates Education 4.0 as s/he…*					
1. participates in professional networks to share knowledge on digital citizenship.					
2. enhances practice to disseminate information on digital citizenship in wider school community.					
3. facilitates involvement in the educative process aligned with digital citizenship.					
4. strengthens support with stakeholders regarding digital citizenship.					
5. communicates promptly the learners' achievement to key stakeholders, including parents and guardians using ICT-based platforms.					
E. Assessment and Reporting *The teacher initiates Education 4.0 as s/he…*					
1. designs and selects assessment tools consistent with E4 goals.					
2. takes relevant steps to solve learners' problem applying E4.					
3. prepares assessment based on E4 technologies in education.					
4. applies E4 in assessing and reporting learners' achievement.					
5. monitors and evaluates learner progress and achievement using ICT-based tools					

Part III: School Climate

Directions: Please indicate what you *really* think about the items enumerated in the table by putting a √ in the column corresponds to the following scale:

5	**Strongly Agree (SA) – Very Frequently Occurs**
4	**Agree (A) - Frequently Occurs**
3	**Moderately Agree (MA) – Often Occurs**
2	**Disagree (D) – Sometimes Occurs**
1	**Strongly Disagree (SD) – Rarely Occurs**

Item Statement *The school…*	5	4	3	2	1
1. provides a sense of vision, and a mission aligned with Education 4.0 initiatives that are shared by all personnel.					

	5	4	3	2	1
2. offers quality instruction and offers support services to all types of students.					
3. engages in "authentic learning" activities wherein the teachers make learners responsible for their own learning through the teachers' efficient and updated ICT-based instruction aligned with Education 4.0 initiatives.					
4. sustains effective supports for students needing alternative modes of communication (e.g., manual signs, communication boards, computer-based devices, picture exchange systems, Braille).					
5. promotes effective learning aligned with Education 4.0 initiatives through having a safe and protective learning environment where learners' rights are given primary importance.					
6. provides an environment for free and open expression of ideas that encourage diversity, equity, and inclusion.					
7. encourages equal participation of all learners through using some forms of making sense of and being responsive to varying learning styles.					
8. leads in tune with learners and community needs aligned with Education 4.0 initiatives					
9. provides instruction, which is dynamic, involving, learner-centered, and challenging.					
10. believes that learners are a crucial part of a classroom community.					

Part IV: Classroom Climate

Directions: Please indicate what you *really* think about the items enumerated in the table by putting a √ in the column corresponds to the following scale:

5	**Strongly Agree (SA) – Very Frequently Occurs**
4	**Agree (A) - Frequently Occurs**
3	**Moderately Agree (MA) – Often Occurs**
2	**Disagree (D) – Sometimes Occurs**
1	**Strongly Disagree (SD) – Rarely Occurs**

Item Statement	**5**	**4**	**3**	**2**	**1**
Classroom Climate *The classroom…*					
1. provides a learning environment where teacher guides learners to learn to work cooperatively as a team.					
2. manifests classroom atmosphere where the teacher and learners value effort and contribution of others.					
3. encourages learners to feel welcome and comfortable					

talking to their teacher.					
4. provides curriculum that is meaningful, relevant and promotes the social, personal, and intellectual growth of learners.					
5. accommodates learners wherein the teacher goes out of his/her way to help students.					
6. promotes student' sense of belonging and sense of competence.					
7. provides teacher a chance to use some form of making sense of, and being responsive to, varying learning styles					
8. provides instruction that is dynamic, involving, learner-centered and challenging.					
9. gives systematic opportunities wherein learners are given chance to reflect on their learning progress.					
10. makes learners as the primary users of assessment information, and assessment and informs students about the learning process, never to punish or shame.					

Appendix F

Guide Questions for the Qualitative Part of the Study

For the School Heads

1. As a School Head, how do you understand Education 4.0 as a concept, and as a current trend in education?

2. How do you perceive ---through your own understanding--- the process of implementing Education 4.0?

3. Does Education 4.0 play a crucial role in your mandate as a School Leader? In what aspects? Cite concrete examples.

4. How do your teachers implement the curriculum in accordance with Education 4.0.?

5. How can you improve the implementation of Education 4.0 in your respective school? In what areas and indicators of Education 4.0 can you better improve?

For the Teachers

1. What is your own idea regarding Education 4.0?

2. Do you see yourself as a good facilitator of Education 4.0?

3. In what ways does your School Head contribute to your understanding of Education 4.0?

4. As a classroom teacher, how important it is to implement Education 4.0 in your class?

5. How relevant is Education 4.0 to your task as an effective facilitator of learning?

Appendix G

Photos for Documentation

Done on March 22, 2024, (with the approval of the District Supervisor and the School Principal), seen here is the pilot testing of the questionnaire at Matias A. Fernando Memorial School, Angat District, Schools Division of Bulacan.

The researcher distributes the questionnaires and allots ample time for teachers to respond thoroughly without disrupting classes. The respective Grade Leaders initiate the photo documentation.

GRADUATE SCHOOL OF EDUCATION

Permission to conduct the survey has been sought from the Schools Division Superintendents, and the Public Schools District Supervisors of EDDIS II, ensuring proper authorization and support for the research.

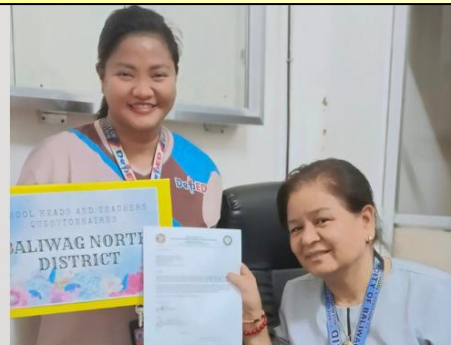The researcher with Baliwag City Schools Division Superintendent, Ma'am Rowena T. Ouiambao, CESO VI.

The researcher with Public Schools District Supervisor of Plaridel District, Dr. Dulce Regina C. Flores.

The researcher with Public Schools District Supervisor of Bustos District, Ma'am Racquel D. Salazar.

The researcher with Public Schools District Supervisor of Baliwag South District, Dr. Irene Labao-Elizalde.

The researcher with Public Schools District Supervisor of Baliwag North District, Dr. Jennifer E. Quinto.

The researcher distributing questionnaires to teachers and school heads in Plaridel District.

The researcher is shown here distributing the questionnaires for the teachers and school heads in the district of Bustos. Other school heads are not in the office during the distribution.

The researcher (left) hands over the questionnaires for teachers and school heads in Baliwag North District to the central principal, Ma'am Marilyn Samson (right), as instructed by the District Supervisor.

The researcher is seen here distributing the questionnaires for teachers and school heads in Baliwag South District (above pictures). As some principals have been attending various seminars, the District Supervisor directs the researcher to deliver them to the Philippine Elementary School Principals' Association (PESPA) l President, Dr. Ma. Charito R. Cruz (below).

GRADUATE SCHOOL OF EDUCATION

The collection of qualitative data involved conducting interviews. Across each district, the researcher needs to interview three (3) school heads and three (3) teachers. The pictures below show the different interviews conducted by the researcher.

Appendix H

Reader/English Critic Certification

Republic of the Philippines
BULACAN AGRICULTURAL STATE COLLEGE
Institute of Education
Pinaod, San Ildefonso, Bulacan, Philippines 3010

READER/ENGLISH CRITIC CERTIFICATION

This is to certify that this Thesis entitled *"School Heads' and Teachers' Initiatives on Education 4.0: Basis for Blueprint for a Strategic Foresight"*, has been reviewed and proofread as the final copy of the graduate thesis of **MARIA ARJIE T. DOMINGO**. This is to certify further that all corrections and technical formatting have been incorporated in this manuscript and is therefore recommended for reproduction.

MARIA ARJIE T. DOMINGO
Reader/English Critic

www.basc.edu.ph / Email: info@basc.edu.ph
Telefax Nos: (044) 762-1427 / (044) 762-0120